European Commission

Period covered: 1 August - 10 September
Issued: 16 September 2013

Crop Monitoring in Europe

MARS BULLETIN Vol.21 No. 9 (2013)

Positive winter cereal season, mixed outlook for maize

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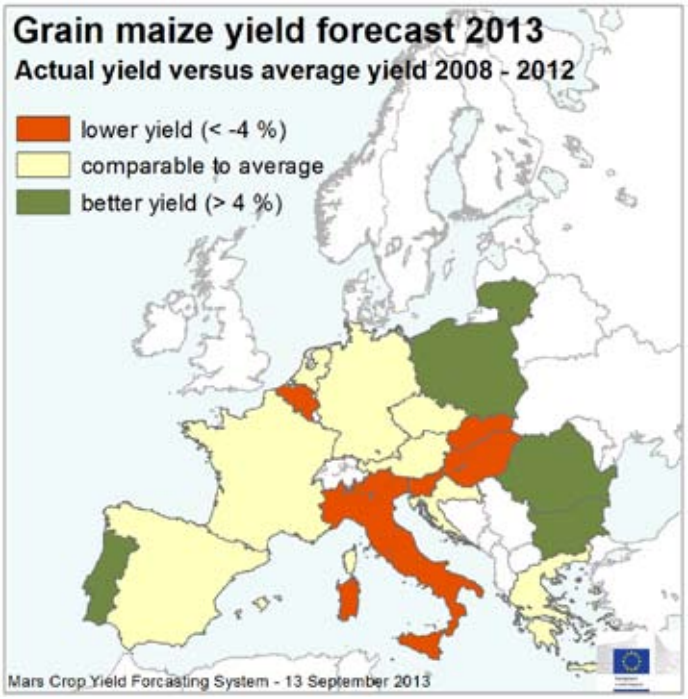
On balance, the EU-28 outlook for cereals remains favourable and well above both last year's levels and the 5-year average, even though the grain-maize yield has been lowered compared to our last Bulletin. The most notable forecast reduction for maize was in Romania and Italy. The EU-28 forecast for grain maize is now slightly below the 5-year average but still clearly above last year's yield. The forecasts for the other main spring and summer crops (sunflower, sugar beet and potato) were all revised downwards for the EU-28 as a whole. In general, the weather during the harvest across Europe was good and forecasts for wheat, barley, rye and triticale for the EU-28 remained practically unaltered from the last Bulletin.



Crop	Yield t/ha				
	2012	MARS 2013 forecasts	Avg 5yrs	%13/12	%13/5yrs
TOTAL CEREALS	4.88	**5.29**	5.06	+8.6	+4.5
Total Wheat	5.18	**5.51**	5.37	+6.4	+2.5
soft wheat	5.41	**5.76**	5.63	+6.3	+2.3
durum wheat	3.12	**3.30**	3.20	+5.6	+3.1
Total Barley	4.39	**4.84**	4.39	+10.3	+10.3
spring barley	3.93	**4.41**	3.83	+12.2	+15.1
winter barley	5.20	**5.51**	5.25	+5.8	+4.8
Grain maize	6.05	**6.88**	6.98	+13.8	-1.5
Rye	3.68	**3.71**	3.33	+0.9	+11.5
Triticale	4.17	**4.25**	4.06	+1.8	+4.6
Other cereals	3.08	**3.34**	3.07	+8.2	+8.9
Rape and turnip rape	3.11	**3.09**	3.04	-0.4	+1.8
Potato	30.55	**31.35**	30.57	+2.6	+2.5
Sugar beet	69.65	**69.66**	69.71	+0.0	-0.1
Sunflower	1.68	**1.88**	1.84	+12.4	+2.4

issued: 13 September 2013

Joint Research Centre

1. Agro-meteorological overview

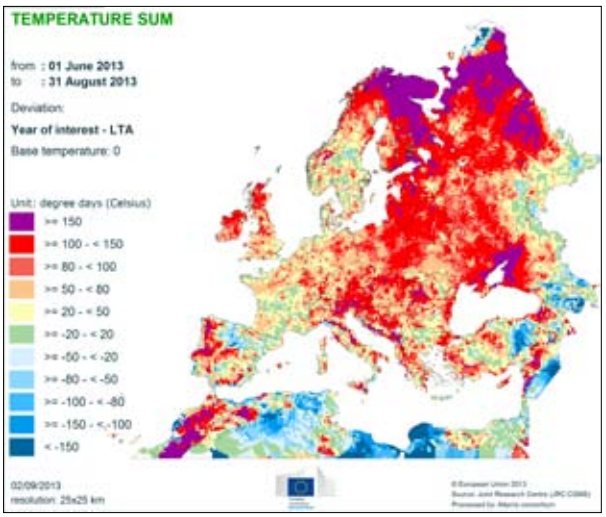
1.1 Areas of concern

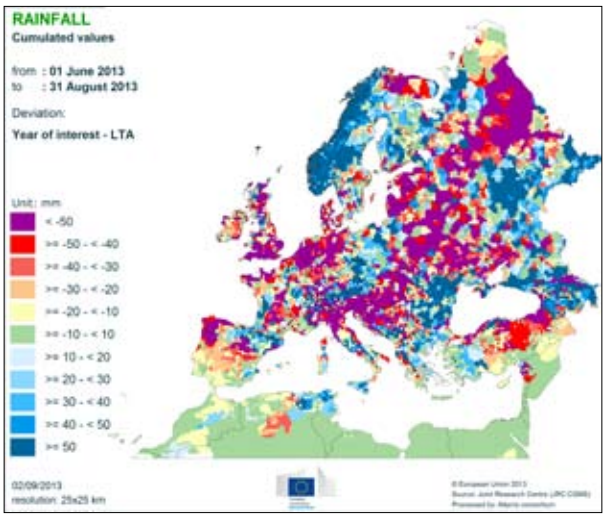
The whole period from the beginning of July until the end of August was characterised by above-average air temperatures and below-average rainfall over major parts of Europe. More rain than usual was recorded for eastern and southern France, northern Poland, and many areas of Russia and Tunisia. In early August, an exceptional heat wave was recorded in Austria, Croatia, Slovenia, north-eastern Italy, Slovakia, Hungary and western Romania, as reported in the area of concern map for August. Summer crop yields in the countries most affected were revised significantly downwards.

No areas of concern are reported for this period. In western and central Europe, late sown winter and spring crops are now ready for harvesting, and weather conditions are beneficial. No further deterioration of summer crop conditions occurred in northern Italy and southern France and good growth conditions were created by favourable weather since the end of August and early September. The weather forecast for the coming days is also good for the upcoming harvest. The early start to the season in Eastern Europe led to an early harvest in the month of August, profiting from dry conditions. Ukraine and Russia are experiencing e a favourable end to the season and no major weather concerns are forecast as the harvesting of summer and spring crops approaches.

1.2 Agro-meteorological review (Summer 2013)

Summer was dry and hot in northern Italy, Hungary, Austria, Slovenia and Croatia. During the whole period the air temperatures were above average over major parts of Europe. June was characterised by warmer conditions in eastern and northern Europe and colder in the west. The warmer conditions continued until the first half of August. In early August, an exceptional heat wave was recorded in Austria, Croatia, Slovenia, north-eastern Italy, Slovakia, Hungary and western Romania. Above-average precipitation occurred in June over south-eastern Germany, Austria, the Czech Republic, northern Romania, Poland and southern Belarus, causing local flooding and widespread waterlogging, and affecting crop growth. The period from 1 July to 31 August was drier than usual in central and eastern Europe, with the exception of eastern and southern France, northern Poland and many areas of Russia. Above-average rainfall was also recorded during the last days of August in some regions of the Balkan Peninsula, Romania and Sicily.

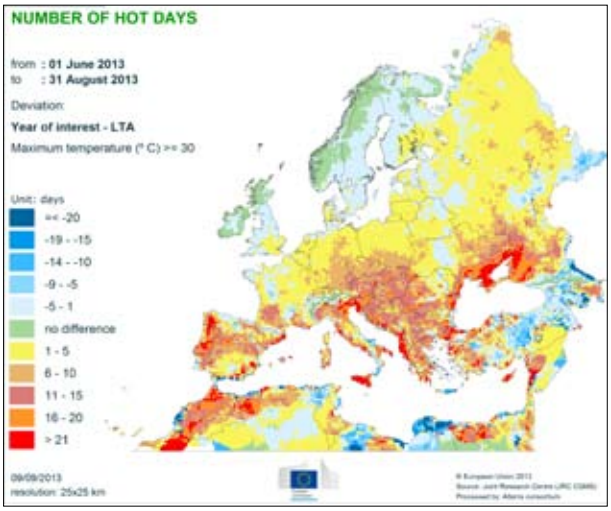


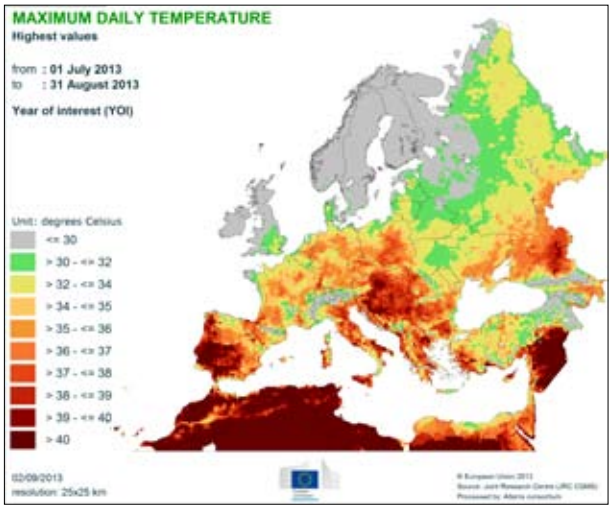


Observed temperatures

June was characterised by colder-than-average conditions over western and central Europe, whereas above-average temperatures were recorded in eastern and northern Europe. In contrast to the first and the third dekads, warmer-than-average conditions also occurred in central Europe during the second decade of June. In Austria, southern Germany and the Czech Republic, temperatures exceeded the long-term average by 4°C to 6°C. During the third dekad of June, negative average thermal anomalies in the range of -2°C to -4°C were recorded in northern Spain, France, the Benelux countries, northern Italy, the Czech Republic and Austria.

Warmer-than-usual conditions continued over eastern Europe during the first half of **July**, with average daily temperatures 2°C to 4°C above average in Russia and the eastern part of Ukraine. Significantly warmer-than-average temperatures were also recorded over the western part of the Iberian Peninsula, with average daily temperatures up to 6°C above average and maximum temperatures of over 38°C. During the second half of July, colder-than-usual conditions predominated in Russia, Belarus, Ukraine, southern Finland, Turkey and the western part of the Iberian Peninsula. By contrast, positive temperature anomalies in the range of 2°C to 4°C were recorded in the most of central Europe, France, Germany, Denmark, the Benelux countries, the UK, Ireland, Austria, the Czech Republic, western Poland, Slovenia and north-eastern Italy. Maximum daily air temperatures of over 36°C were recorded between 27 and 28 July in the southern part of the Iberian Peninsula, north-western and southern Italy, Hungary and the Balkan Peninsula. In **August**, above-average temperatures were observed over the whole of Europe, with the exception of central France and central Turkey, where negative average temperature anomalies of up to -2°C were recorded. During the first days of August, an exceptional heat wave was recorded in Austria, Croatia, Slovenia, north-eastern Italy, Slovakia, Hungary and western Romania, with maximum temperatures of over 38°C. Positive thermal anomalies in the range of 2°C to 4°C were observed from 1 to 15 August in south-western Poland, Austria, Hungary, the eastern part of the Czech Republic, Romania, the Balkan Peninsula, Italy and central Russia. After this warmer period, temperatures returned to average until the end of August. The southern and western parts of the Iberian Peninsula experienced maximum temperatures of between 37°C and 40°C for the whole month. The temperature sum for the period as a whole (1 June to 31 August) exceeded the long-term average by more than 100 degree days over northern and eastern Europe, the western part of the Iberian Peninsula and in eastern and southern Italy. The number of hot days (Tmax>30°C) cumulated from 1 July to 31 August was 16 days more than the long-term average over the western part of the Iberian Peninsula, south-western France, northern Italy and most regions of central and southern Italy, the Balkan Peninsula, Austria, Hungary, Slovakia, the western part of Romania and the south-eastern part of Ukraine.



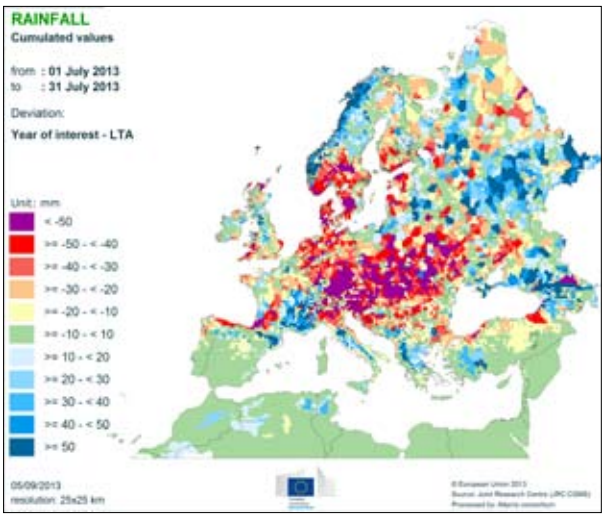


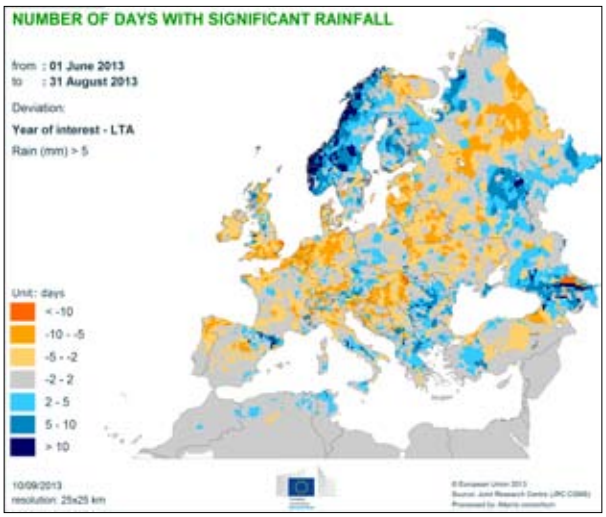
Observed rainfall

During the first half of **June**, high rainfall of over 80 mm, exceeding the long-term average by more than 50 mm, was experienced in south-eastern Germany, Austria, the Czech Republic, northern Romania, Poland and the south of Belarus, causing local flooding and widespread waterlogging. The exceptionally wet conditions recorded in central Europe from May to the first half of June contributed to poor soil aeration, increasing the risk of nutrient deficiency and pest damage, and have affected crop growth, especially for summer crops. By contrast, lower-than-average precipitation occurred in northern and central France, the British Isles, the Benelux countries, northern Germany, western Italy and Russia. The second half of June was characterised by drier-than-average conditions over northern Italy, Slovenia, Croatia, Belarus and the Baltic countries. Cumulated rainfall over this period exceeded the long-term average by more than 40 mm in Moldova, eastern Romania, Bulgaria, Poland, Austria, the Czech Republic and locally over northern Germany, the Benelux countries, and northern and western France. The period from 1 to 15 **July** was characterised by drier conditions over central and western Europe. Precipitation levels of 30 mm below average were recorded over northern Italy, Germany, the Czech Republic, Denmark, the Benelux countries, western and northern France, the British Isles, the southern part of the Scandinavian Peninsula and central Ukraine. By contrast, rainfall locally exceeded the average by more than 50 mm over the northern Black Sea regions and northern Poland. The cumulated rainfall recorded during the second half of July exceeded the long-term average by more than 50 mm in southern and western France, central Russia, Ireland and the northern part of the UK. During this period, dry conditions continued over southern Germany, northern Italy and the Ukraine, and also occurred in Austria, southern and eastern Poland, Hungary and Slovenia. Normal rainfall conditions were observed elsewhere.

Drier-than-usual conditions prevailed during the first half of **August** in northern Italy, Croatia, Slovenia, Hungary, Bulgaria, western Ukraine, south-eastern Poland and Belarus, whereas rainfall locally exceeded the long-term average by more than 30 mm over the southern part of the Scandinavian Peninsula, the western coast of the UK, the Baltic countries and central Russia. Average precipitation prevailed elsewhere in Europe. During the second half of August, most of northern Europe and southern France, experienced drier-than-usual weather conditions. Lower-than-usual precipitation in the range of -30 to -40 mm occurred over the British Isles, southern France, western Spain, northern Germany, the Benelux countries, northern Poland, the Baltic countries, western Belarus, Finland and northern Russia. In large areas of western and southern France, the western part of the Iberian Peninsula and southern Scandinavia the total rainfall cumulated during this period did not exceed 10 mm. By contrast, precipitation levels that were above average by more than 30 mm were recorded in Austria, Romania, Croatia, central Ukraine, north-eastern Italy, along the coasts of the western Mediterranean region, Spain and Italy (*Sicily, Lazio, Sardinia*).

In summary, the whole summer period was drier than usually in the Benelux countries, southern UK, Germany, Denmark, the north-western Iberian Peninsula, northern Italy, the northern Balkan Peninsula, Hungary, south-eastern Poland, the Baltic countries, Belarus, Ukraine, western Russia and the southern coasts of the Black Sea. By contrast, Austria, the Czech Republic, northern Poland and the northern part of the Black Sea regions experienced wetter-than-average conditions. Above-average rainfall was also recorded during the last days of August in some regions of Balkan Peninsula, Romania and Italy (*Sicily*).



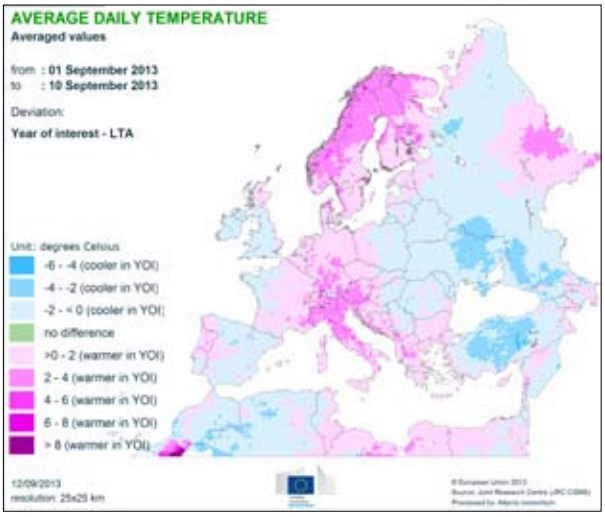


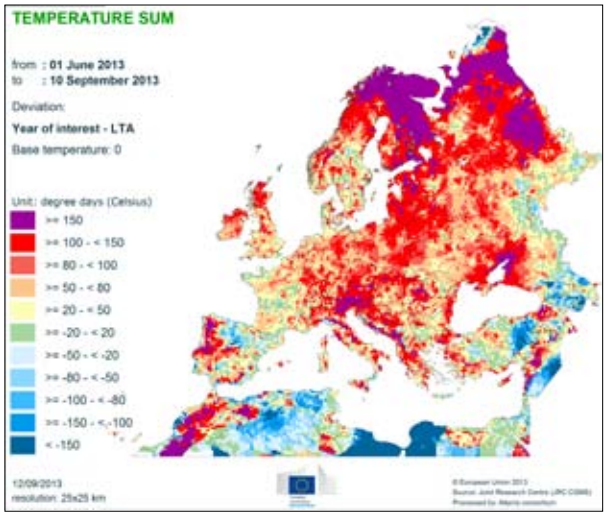
1.3 Agro-meteorological overview (1 -10 September)

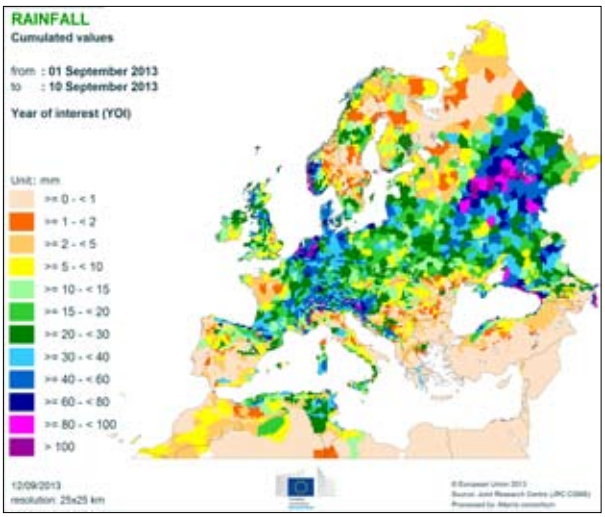
In the first dekad of September, air temperatures remained above average over major parts of Europe. Weather conditions remained drier than usual in northern Italy and in the Balkan region, with the exception of Slovenia. Above-average rainfall occurred in central Europe and Russia.

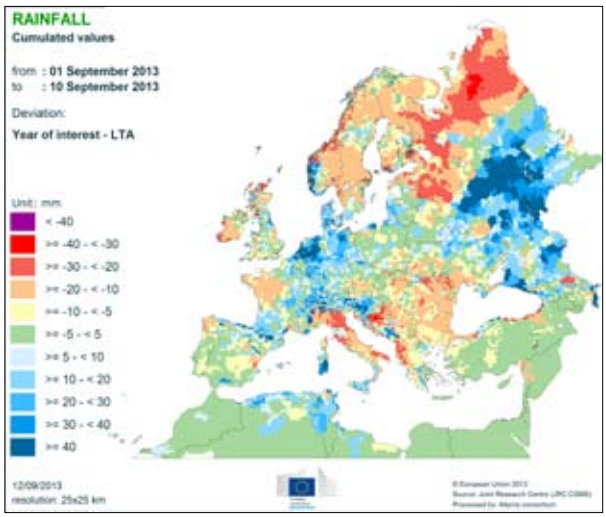
During the first dekad of September, average temperatures remained slightly above average in a large band across Scandinavia, Central Europe, and the eastern Mediterranean region, as well as in the western parts of the Iberian Peninsula. During this period, the mean daily air temperature was 2 to 4°C higher than the long-term average in Germany, the Benelux countries, Austria, Slovenia and Italy, and a few days with maximum temperatures above 30°C were recorded in Italy, in the western part of the Iberian Peninsula, in the Benelux countries and western Germany. By contrast, eastern Europe experienced slightly below-average temperatures during the period of review, but cumulated temperatures since the beginning of June remained above average.

During the entire period of review, rainfall was less than 5 mm in the Iberian Peninsula, Italy (with the exception of Tuscany and Sicily), the Balkan Peninsula, Hungary and western part of Black Sea regions, further increasing the water deficit. Lower-than-average precipitation was also recorded in north-western France and large parts of northern Europe. Above-average rainfall, in the range of 30-60 mm, was recorded in Denmark, Germany, the Benelux countries, eastern France, Slovenia, northern Ukraine and central Russia, thus locally improving the soil moisture conditions for summer crops. Normal rainfall conditions were observed elsewhere.



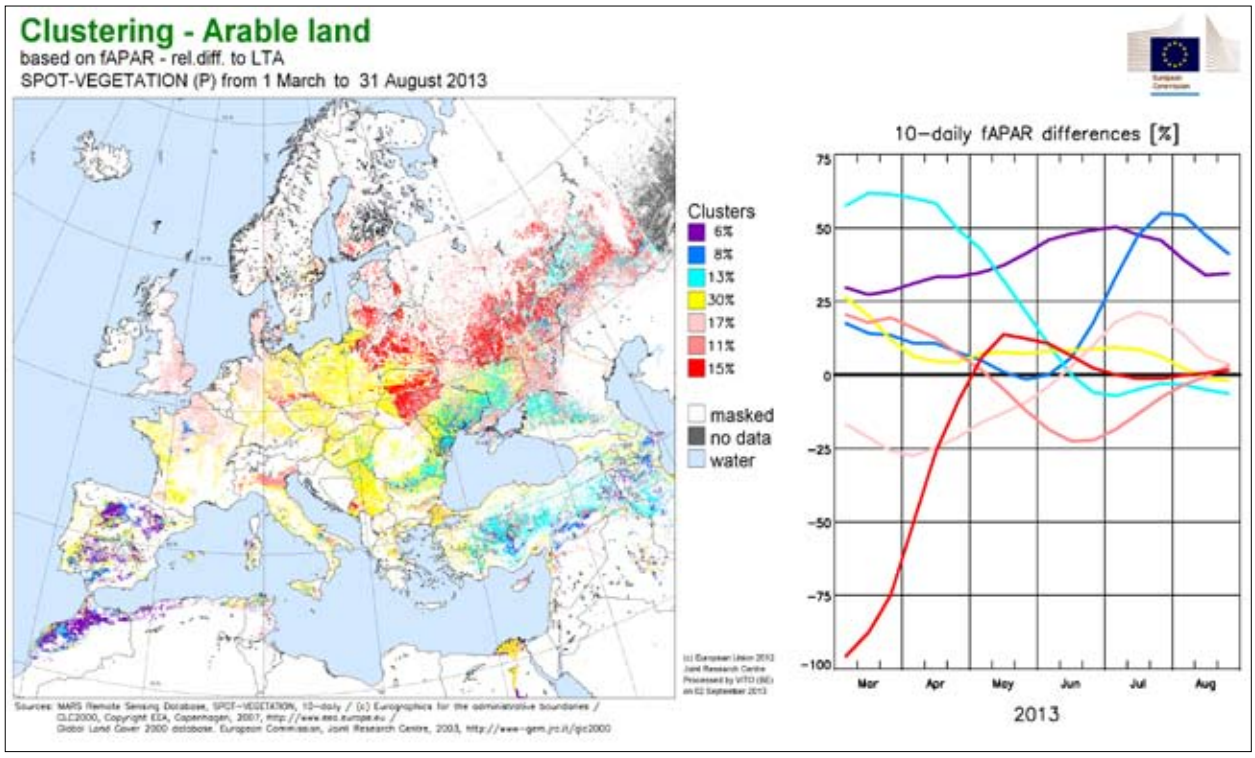




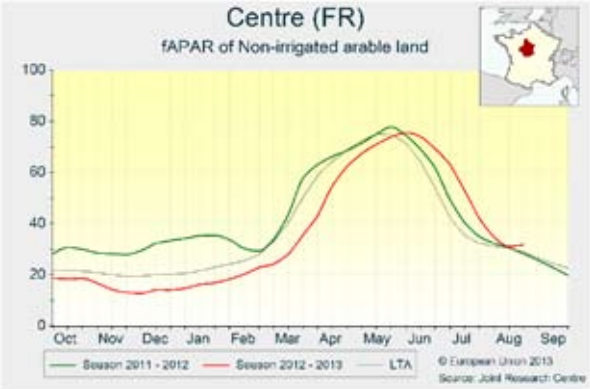


2. Remote Sensing analysis – observed canopy conditions

Partial recovery of summer crops in northern Italy and France. Good expectations for summer crop yields in the Black Sea region.



The cluster map displays the fAPAR (fraction of Absorbed Photosynthetically Active Radiation) behaviour from the beginning of the current season, 1 March, to 31 August, as compared to the long-term average (LTA / 1998 – 2012) values for the season. Time series for the average of all pixels of each cluster are presented in the right-hand graph. The regions in **violet** had an exceptional season with biomass development well above the average. This trend is visible in Spain (e.g. *Castilla y Leon*), where an exceptionally good yield of winter crops was followed by fairly good summer crop development. The **light blue** curve represents regions around the Black Sea which had advanced winter and summer crop cycles. In **Romania** (e.g. *Sud Est*), the heat waves at the end of July and the beginning of August slowed down biomass accumulation but had no severe impact thanks to sufficient soil moisture content. In **southern and eastern Ukraine**, the dry conditions of July and August were optimal for the winter crops' harvest. Summer crops benefitted from the high temperatures and the rains of late August (e.g. *Poltav'ska*). The **yellow** areas, mainly in **Central Europe**, represent regions where canopy development was slightly higher than average for the whole crop season. In **Germany**, the positive thermal anomalies led to a recovery of the delay in summer crops' development (e.g. *Oberbayern*) but the scarce soil moisture could have affected the reproductive phases in August. In **Hungary**, the lack of precipitation persisted during July and August, often coupled with very high temperatures. These climate conditions led to critically low soil moisture content during the flowering and grain-filling phases of the summer crops and, immediately after, an early senescence (e.g. *Del Alfold*). The **dark pink** profile shows the situation of the main summer crop fields in the Po Valley in **Italy** (e.g. *Lombardia*) and in *Aquitaine* in **France**. Canopy conditions improved in these regions, reaching average development, but most probably this gain will not be reflected in the final yields. In regions marked in **light pink**, the winter and spring crops did not recover from the late start to the growing season. Nevertheless, crops in these regions showed average development (e.g. *Lincolnshire*). This is also visible in some regions of **central France** (e.g. *Centre*) where the strong delay of spring cereals was not fully recovered, but this had no impact on the final yield expectations. The **red** profile represents the biomass evolution of winter crops during a favourable summer: dry conditions in the **Baltic regions** led to an optimal harvest and wet conditions in **Russia** helped to replenish the soil moisture content during the grain-filling stage.


Centre (FR)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Oberbayern (DE)
fAPAR of Non-irrigated arable land
100
80
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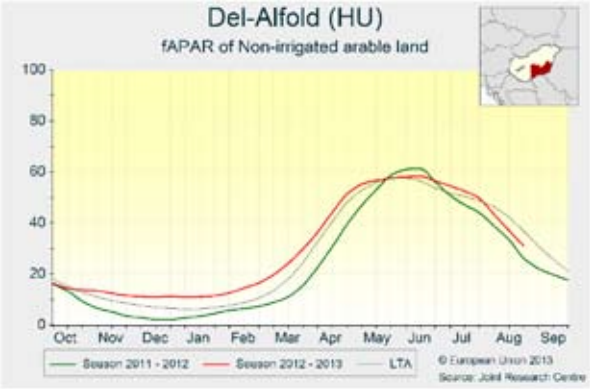
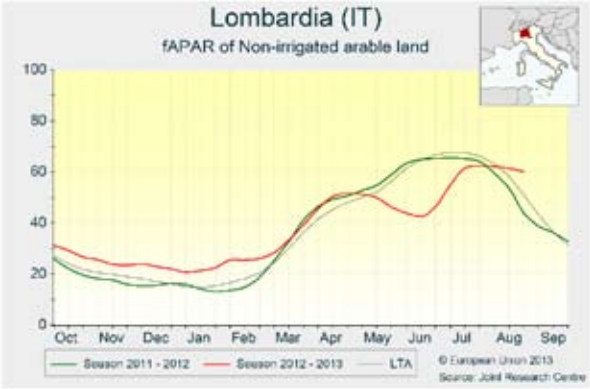
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Del-Alfold (HU)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Lombardia (IT)
fAPAR of Non-irrigated arable land
100
80
60
40
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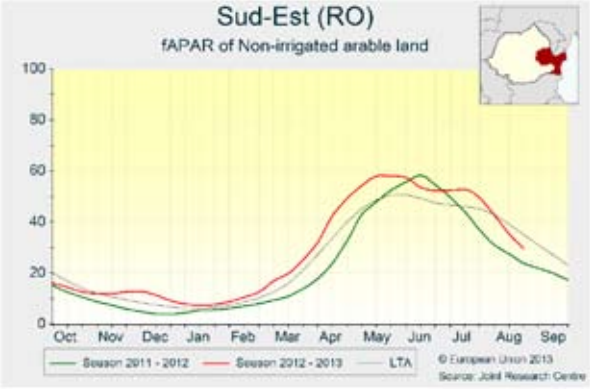
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Sud-Est (RO)
fAPAR of Non-irrigated arable land
100
80
60
40
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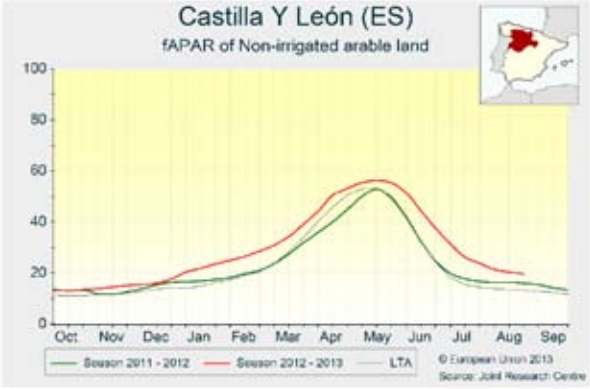
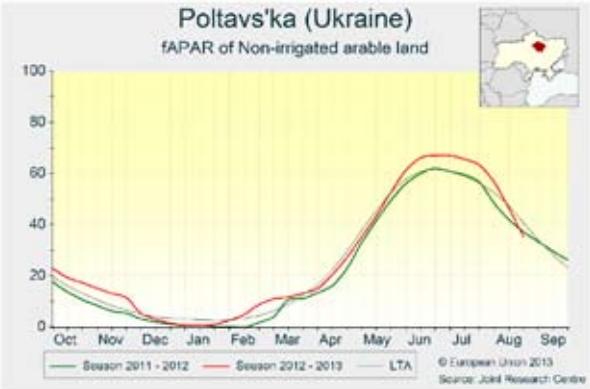
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Castilla Y León (ES)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Poltavs'ka (Ukraine)
fAPAR of Non-irrigated arable land
100
80
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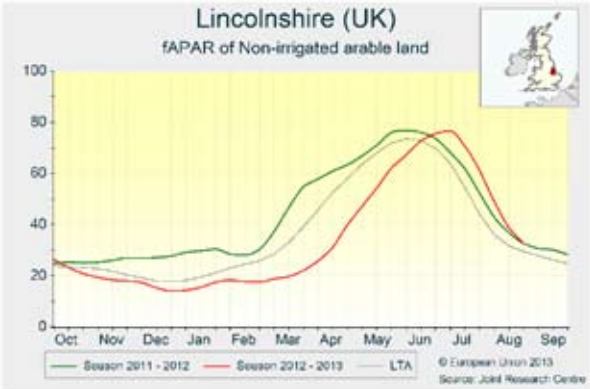
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre


Lincolnshire (UK)
fAPAR of Non-irrigated arable land
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
LTA
© European Union 2013
Source: Joint Research Centre

3. Country analysis

3.1 European Union

On balance, the EU-28 outlook for cereals remains favourable and well above both last year's levels and the 5-year average, even though the grain-maize yield has been lowered compared to our last Bulletin. The most notable forecast reduction for maize was in Romania and Italy. The EU-28 forecast for grain maize is now slightly below the 5-year average but still clearly above last year's yield. The forecasts for the other main spring and summer crops (sunflower, sugar beet and potato) were all revised downwards for the EU-28 as a whole. In general, the weather during the harvest across Europe was good and forecasts for wheat, barley, rye and triticale for the EU-28 remained practically unaltered from the last Bulletin.

France

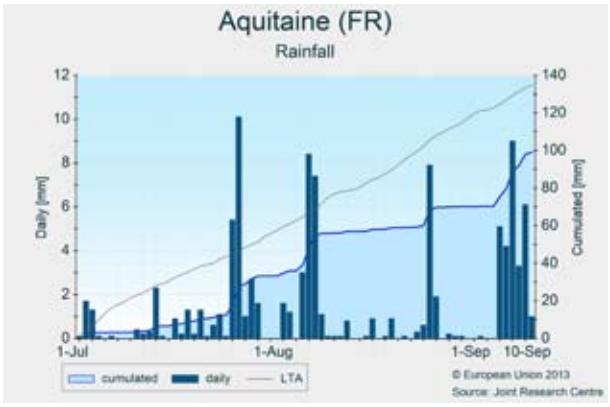
Crops benefited from warmer temperatures

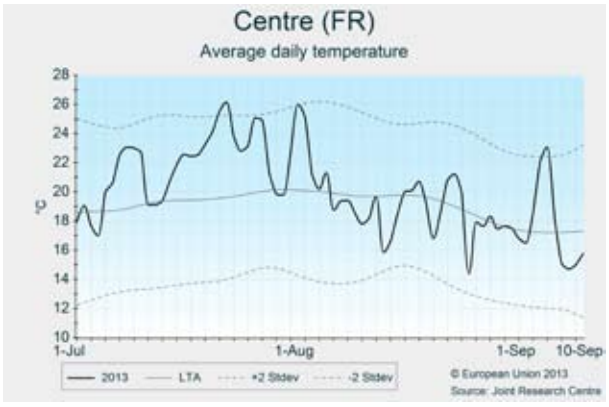
Following a rainy and cold spring, July and August were characterised by dry conditions and temperatures above the average in most regions. Crop development was delayed during spring but meteorological summer conditions accelerated crop growth, and yields are expected to be close to the 5-year average.

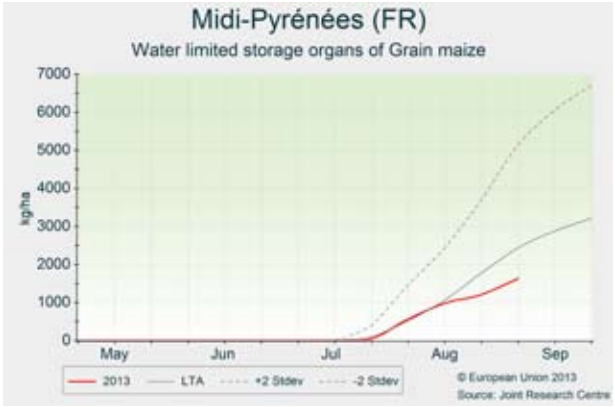
After a rainy spring, rainfall remained below average in most regions in July and August (49 mm below the average in *Aquitaine*, 34 mm in *Centre*) except the south-eastern regions where conditions were close to average. From the beginning of July until the first dekad of August, temperature sums were 75 degree days above the average in most regions. Since the second dekad of August, temperatures have been close to average. Even though warm temperatures boosted crop growth in July, the ripening of cereals was still delayed by approximately ten days. Sparse rainfall and seasonal temperatures provided good conditions for an optimal harvest, despite its initial delay. Thus forecasts for soft wheat are close to the 5-year average, whereas barley yields are expected to be slightly higher.

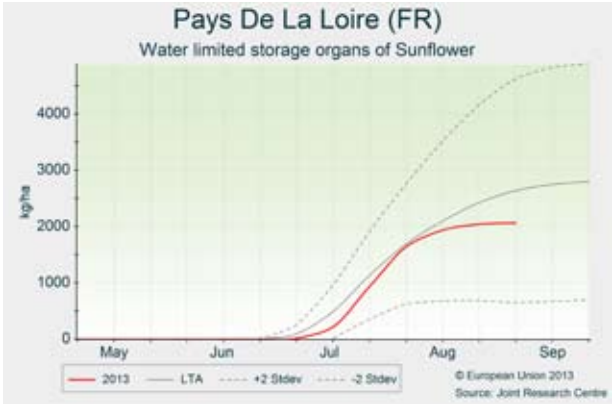
Concerning sunflower and maize, temperatures were favourable for a steady growth, but sparse rainfall since the beginning of summer had a negative impact on the yield potential. As the sowing of sunflowers was delayed in some regions, harvests are also expected to be delayed. The meteorological conditions of the coming weeks will influence final yields.

For sugar beets and potatoes, the delay caused by cold temperatures during spring is foreseen to lead to a slight decrease in yields.









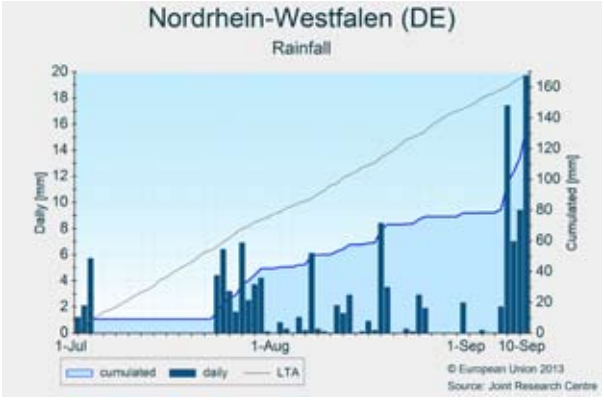
Germany

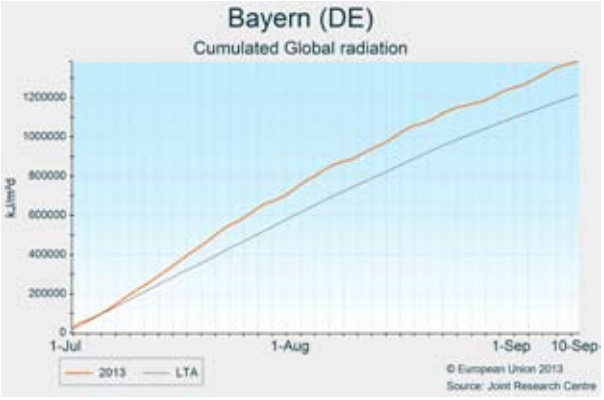
Good yields for winter cereals conclude an atypical growing season

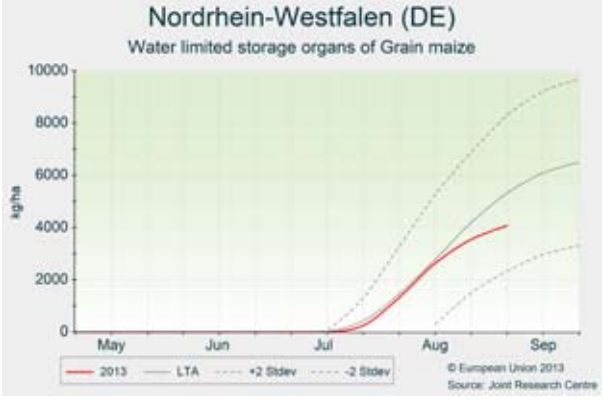
Good harvesting conditions for winter and spring cereals were only interrupted by a few rainy days in August. Consequently, above-average yields are confirmed. Maize yields continue to be vulnerable due to sparse rainfall during July and August, but beneficial temperature accumulation is compensating the development delay.

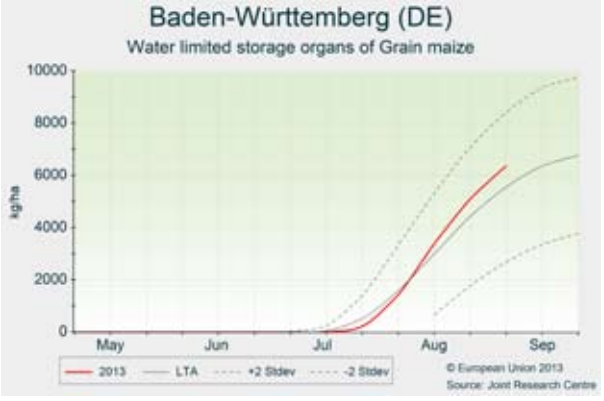
Summer conditions became established in Germany at the start of July. The weather was warm and dry with a rainfall deficit of 25 to 75 mm and few rainy days. There were more hot days than average, with maximum temperatures reaching 35 – 37°C, but not for excessively long periods. Rapidly depleting soil moisture content had no negative effect on the almost mature winter and spring cereals, and the above-average yield expectations are maintained. The harvesting of these crops started under good conditions, only interrupted by some rainfall in August, and is now completed.

The negative climatic water balance in July was unfavourable for maize, sugar beet and potato crops which suffered from water scarcity. In the southern regions, where roughly half of the maize is produced, rainfall during August brought some relief. Dry conditions persisted in northern and central Germany, albeit to a lesser extent than in July. On the whole, precipitation for August was average or slightly above in *Bayern* and *Baden Wuerttemberg*, whereas a moderate deficit was observed for the remaining *Bundesländer*, but these received some rain in early September that was beneficial for summer crops. Temperatures continued to be seasonal in August; more frequent hot days were registered than on average, but no excessive heat wave was recorded. Radiation was well above average for both months. The previous delay in maize development has been compensated thanks to the above-average temperatures of July and August. Maize development is now slightly advanced, and is simulated to be at the grain-filling stage across the country. The yield forecast at national level remains below average due to the suboptimal growth conditions, reflected by low soil moisture contents and below storage organ weights simulated in western Germany.









Poland

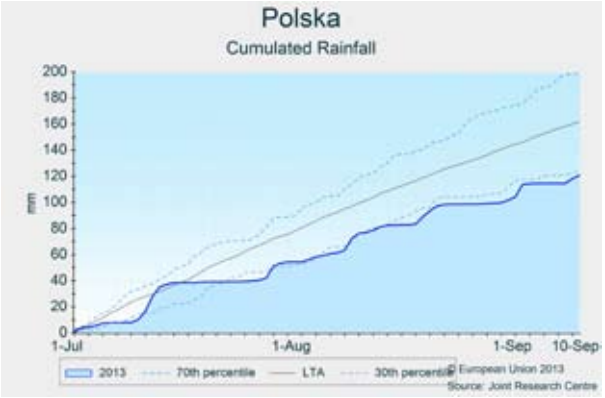
Hot and dry weather with good crop development

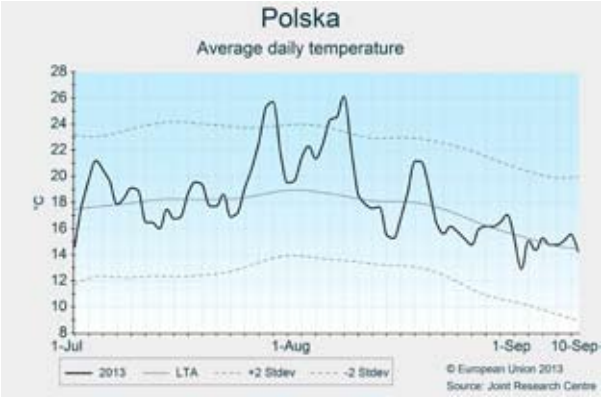
During the period analysed, Poland experienced above-average temperatures which promoted robust crop growth and development, even though rainfall was lower than the long-term average. Weather was favourable during the harvest.

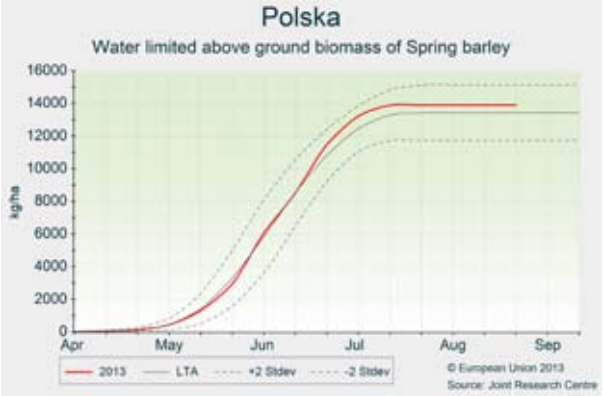
Warmer-than-usual weather prevailed across the country. The highest anomaly was recorded in *Lubeskie*, west *Wielkopolskie* and north *Dolnoslaskie*, with air temperatures for the review period as a whole that were on average 1.0 to 1.5 °C above the long-term average. The end of July and the first dekad of August were exceptionally hot, and large portions of the country experienced heat waves. Rainfall was below average in most of the country; but rainfall patterns varied substantially and some regions in the north (*Pomorskie* and *Warminsko-Mazurskie*) received elevated levels of precipitation.

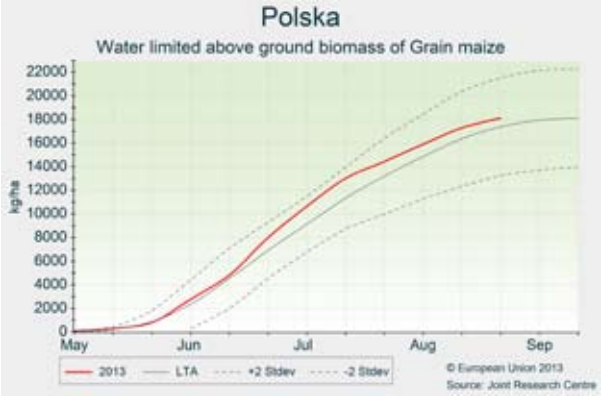
These warm and relatively dry weather conditions, which followed the period of abundant rainfalls in spring and early summer, initially accelerated crop growth and development. Biomass accumulation was higher than the long-term average for most crops. Winter and spring crops were harvested under favourable weather conditions, with the exception of the winter rapeseed harvest, which was affected by the elevated rainfall levels in *Warminsko-Mazurskie*, *Podlaskie*, *Slaskie* and *Malopolskie*. Prolonged hot and dry weather depleted the soil water reserves, however, and then slowed down biomass accumulation for some summer crops, grain maize in particular.

On balance, our crop yield forecast indicates higher yields than the 5-year average for all crops, and higher yields relative to those of last year for soft wheat, triticale, rapeseed and winter barley.







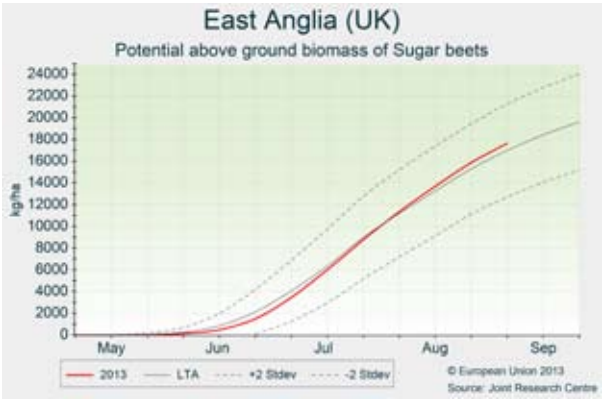


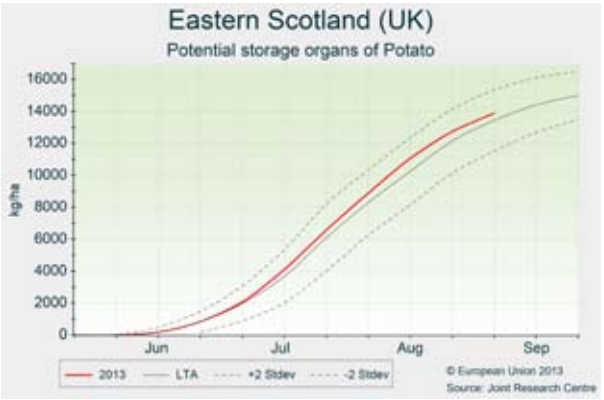
United Kingdom and Ireland

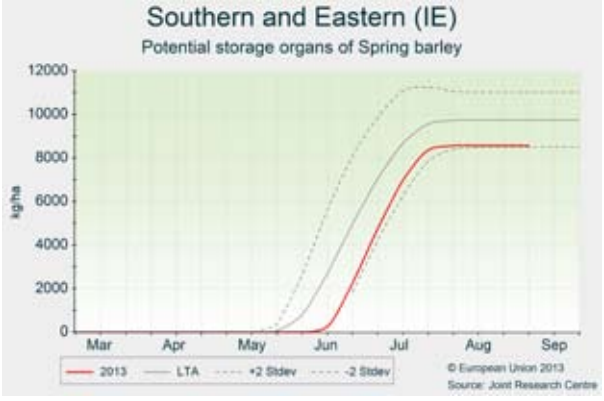
Delayed cereal season finishes with good harvesting conditions

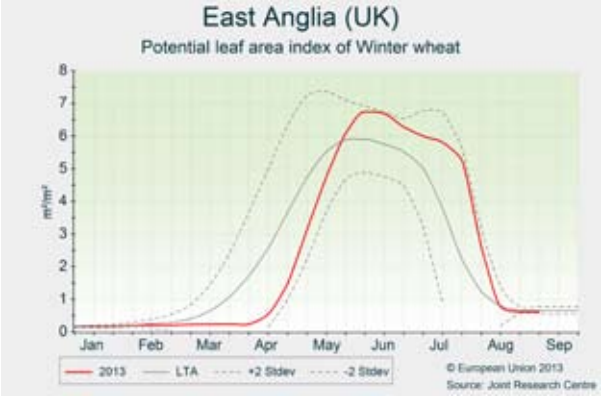
Cereals in the UK are expected to show fairly good yields but in Ireland the outlook remains below average. Summer crops are evolving according to their long-term average

The summer period was relatively dry and warm in England, providing good conditions for cereals to reach maturity and allowing farmers to harvest them appropriately. The simulated leaf area index curve of winter wheat summarises the situation: the delayed season became prolonged, thereby reaching higher biomass levels. The yields are therefore expected to be above or close to average for winter wheat and barley. In Scotland and Ireland the summer has been warmer and wetter than average. The outlook there is not as positive as in England, because cereals have matured too quickly for optimal yield formation and harvesting may have been more complicated. Cereal yield forecasts in Ireland have thus been maintained below the average. Weather conditions during the summer period have prompted the good development of sugar beets and potatoes, which, according to our crop growth simulations, are faring close to or above the average. This is reflected in the respective forecasts.









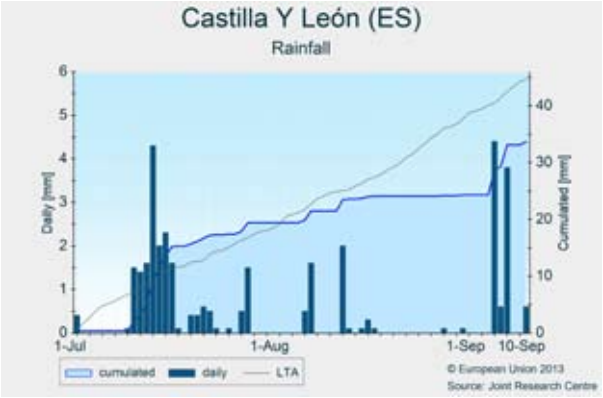
Spain and Portugal

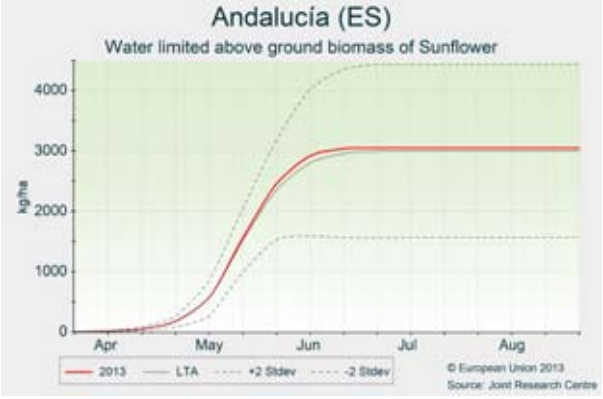
Favourable expectations for summer crops

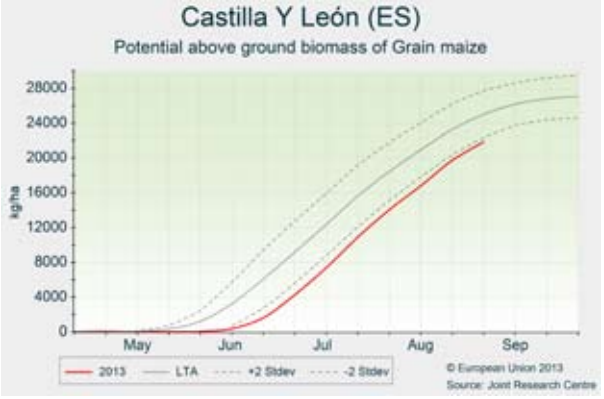
Weather conditions during July and August have been quite positive for summer crop growth. Temperatures have generally been warmer than usual, leading to an improvement of grain maize biomass growth rates. Rainfall has been scarce, although episodic thunderstorms were registered in July and August.

Meteorological conditions during July and August were favourable for the growth of summer crops. The increase in temperatures observed from the end of June continued during July and August, with daily averages above seasonal values in whole of the Iberian Peninsula. Rainfall was scarce, especially in the southern half of the Peninsula, and manifested mainly as heavy thunderstorms. Sporadic hail events were observed, especially in northern regions (*Castilla y Leon, Cataluña, Aragon*), from mid-July until the first quarter of August, which could have locally affected grain maize and winter cereals that had not yet been harvested.

The winter cereal season concluded in August, with excellent results both in soft wheat and barley. Sunflower crops are currently reaching maturity in southern regions (*Andalucia, Castilla La Mancha, Alentejo*) and ripening in the north (Aragon), with yield potentials slightly above those of the past 5 years, due to favourable weather conditions. Grain maize is currently coming to the end of the grain-filling period but, according to our predictions, crop development will not have fully recovered from the cold temperatures registered during spring and early summer. The outlook is nevertheless positive for this crop in the absence of water stress, thanks to an adequate irrigation supported by high water reserves throughout the season. High yields are also expected for sugar beet and potato crops.







Italy and Slovenia

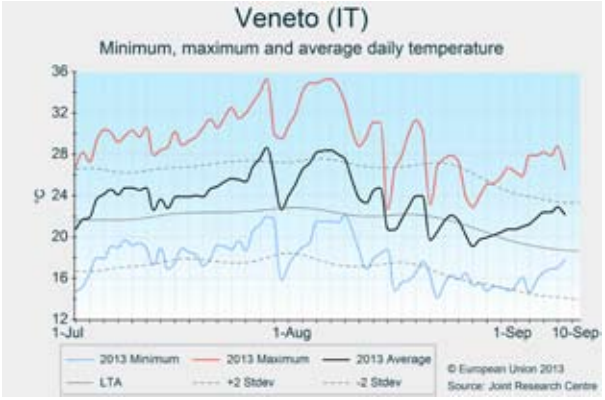
Dry and hot conditions affected summer crops

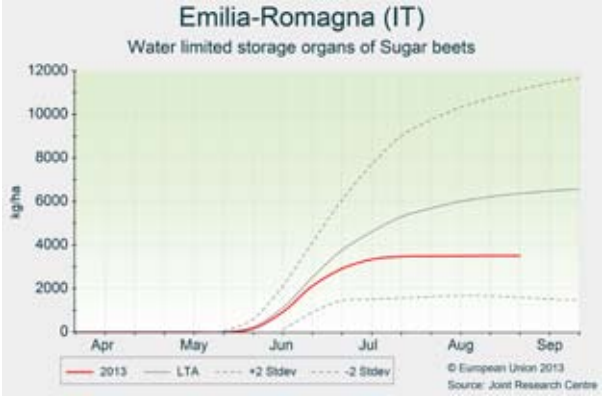
The strong delay in the phenological development of summer crops has been compensated, but prolonged heat waves and water shortages affect yields in northern Italy and Slovenia.

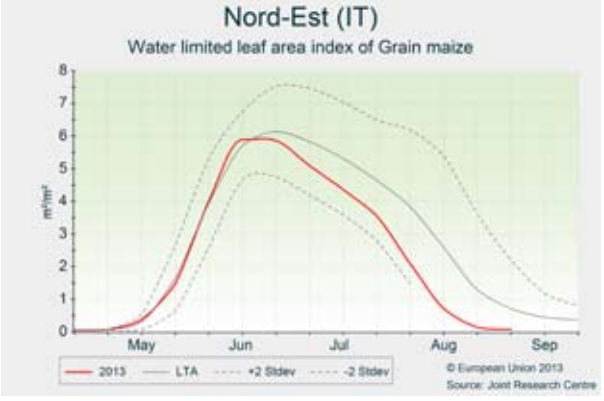
The summer period under review was dry and hot in northern Italy and Slovenia, and an exceptional heat wave was recorded during the first days of August.

From 1 July to 13 August the air temperatures remained above average over the whole of Italy and Slovenia. By contrast, the period from 14 to 31 August was characterised by slightly below-average temperatures in northern Italy and in Slovenia. Maximum temperatures recorded during the analysis period reached 37°C to 40°C over all regions, with the exception of *Piemonte*.

The period from July until the first half of August was very dry in Slovenia and northern Italy, especially in *Lombardia*, *Emilia Romagna*, *Veneto*, *Friuli-Venezia Giulia* and the eastern part of *Piemonte*. This period was the driest in our climatological record in *Zahodna Slovenia*, *Friuli-Venezia Giulia* and *Emilia Romagna*. During the last ten days of August and early September rainfall exceeding 40 mm was recorded in Slovenia, northern Italy and *Sicily*, leading to a slight increase in soil moisture content. The delay in phenological development, incurred in the beginning of the season, has now been compensated thanks to the above-average temperatures. The critical flowering and grain-filling phases for maize largely coincided with a long hot and dry period which affected yield potentials, especially in rainfed areas. Given the high variability and vulnerability recorded in the maize fields, some crops are expected to be harvested early as green maize, whereas only those fields in better condition would be harvested later as grain maize. The final yields are expected to be below average, anyhow, and the forecast was revised slightly downwards. The sugar beet yield is also forecasted to be below the average of the past 5 years, due to the dry and hot conditions recorded in *Veneto* and *Emilia Romagna*. For sunflower crops, which benefited from the rainfall in central Italy during July, around average yields are expected. The harvesting of winter cereals was completed in July.





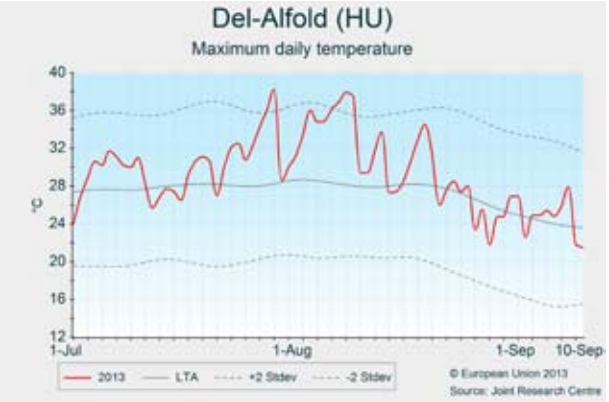


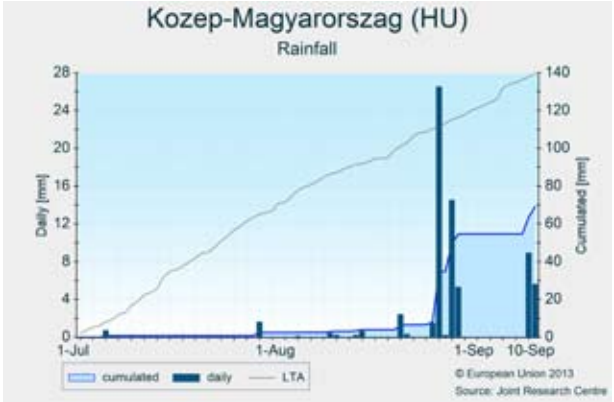
Hungary

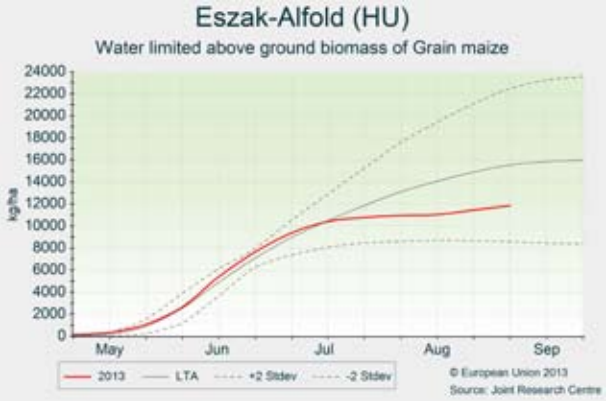
Yield expectations of summer crops reduced due to water shortage

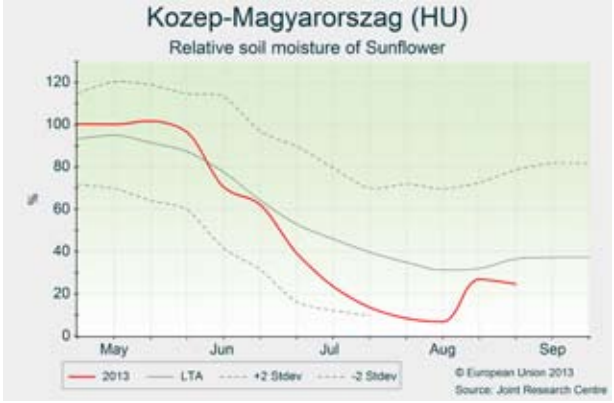
Winter and spring cereals were harvested under near optimal conditions with minimal harvesting losses. In the case of summer crops, however, the high temperatures and scarce precipitation led to a sudden decrease of soil moisture, reducing biomass accumulation and yield expectations. Spatial variation among maize and sunflower crop stands is considerable depending on local conditions and sowing time. Late-sown maize was affected particularly seriously as the most pronounced period of water deficit coincided with the delicate flowering and grain-filling phases.

In July and August, daily temperatures mostly fluctuated just above the long-term average. During the last days of July and the first dekad of August, however, two heat waves occurred with maximum temperatures exceeding 35°C for 5-10 days, and reaching 38-40°C in most of Hungary during the hottest days. Some rain (5-30 mm) was recorded during the first dekad of July in the western half of Hungary, but the following 40 days were predominantly dry. The last dekad of August was characterised by mild temperatures and abundant rainfall, but this precipitation arrived late for the summer crops. The dry and very hot weather conditions of July and August would have had negative effects on maize pollination during the flowering phase; biomass accumulation slowed down due to water stress; the grain-filling period was shortened due to accelerated phenological development; and the canopy suffered from early senescence. Consequently, the optimistic maize yield forecast of July was revised sharply downwards. The yield losses are expected to be less dramatic for sunflowers, which is a more drought-tolerant crop. Potatoes and sugar beets also suffered from the hot and dry conditions. The yield expectations for these crops are modest though better than in 2012 which experienced more severe drought conditions.









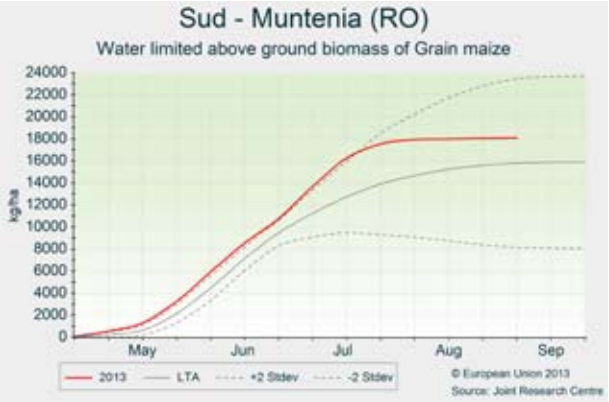
Romania

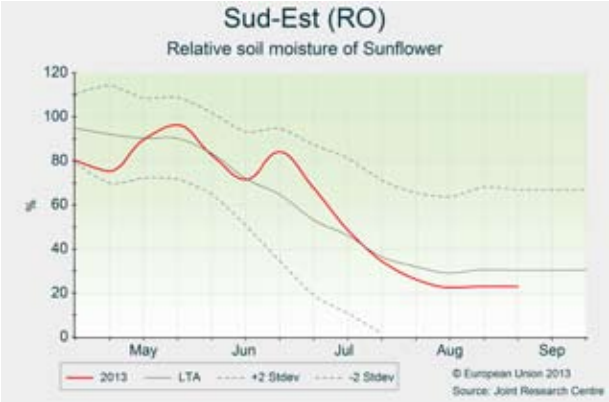
Positive outlook for sunflower and maize yields

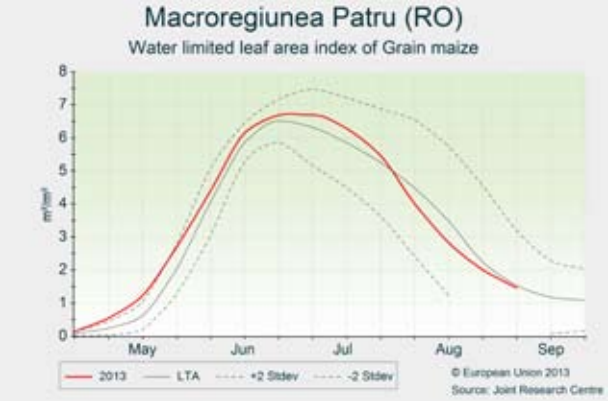
Good harvest conditions apart from intensive precipitation which interrupted the harvest in late June. In July, wet soils, near normal temperatures and high solar insolation provided good conditions for the growth and biomass accumulation of maize and sunflower crops. Consequently, above-average yields are forecast for both crops. Scarce rainfall and high temperatures in late July and August resulted in yield losses of potatoes and sugar beets. Warm weather advanced crop development considerably and the harvesting of summer crops will start earlier than normal.

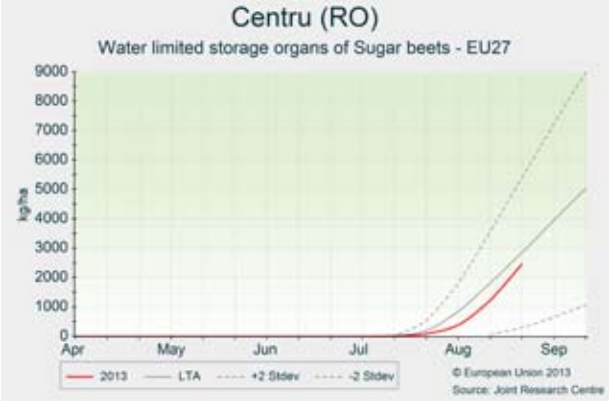
Abundant rains in the last dekad of June followed by moderate rainfall at the beginning of July replenished the soil moisture content under summer crops (typically above 70%) with the only exception being the *Marcoregiunea Patru* region. Consequently, grain maize and sunflower crops completed flowering and started grain filling with good water supply conditions. The weather became dry from mid July until 22 August, affecting all crops. More or less normal thermal conditions prevailed until 26 July, but then daily temperatures fluctuated continuously above the average and maximum temperatures frequently exceeded +30°C, resulting in 8-12 hot days (Tmax>35°C), particularly in the western and south-western areas.

Until the end of July, soil moisture was able to partly mitigate the impact of the dry weather, with the result that photosynthesis and biomass accumulation were exceptional in the eastern half of the country and satisfactory in western areas. Potato crops benefited from the June rains, but tuber filling was seriously compromised by the dry weather. Sugar beet was also badly affected but may recover as a result of recent precipitation. An early harvest is probable in several areas in order to avoid a decrease in sugar content.









Bulgaria

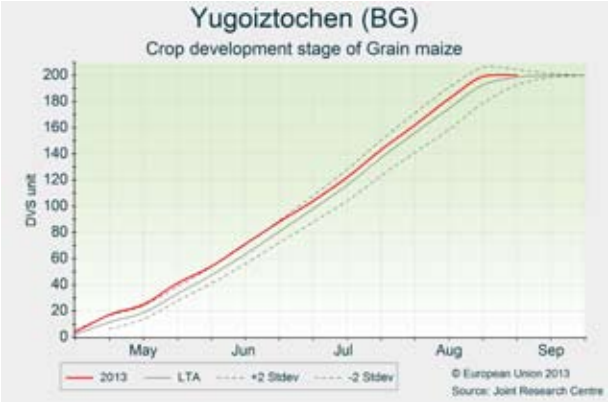
A good season for maize and sunflower crops

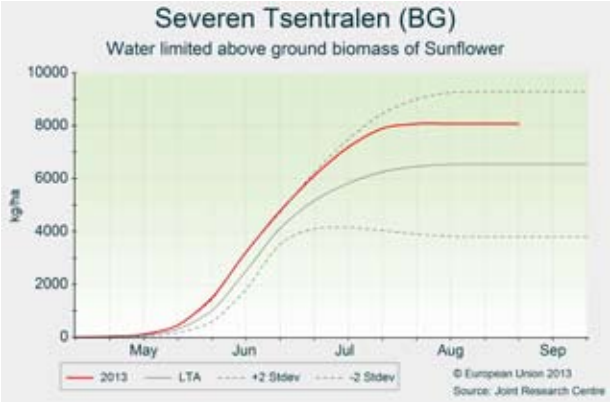
The harvesting of winter cereals suffered some delay due excessive rainfall at the end of June and early July, but later experienced no weather-related problems. Summer crops in northern regions benefited from the more substantial rains which kept soil moisture at an adequate level during the delicate flowering and grain-filling phases. In the southern half of Bulgaria, however, water supply was limited, resulting in lower yields.

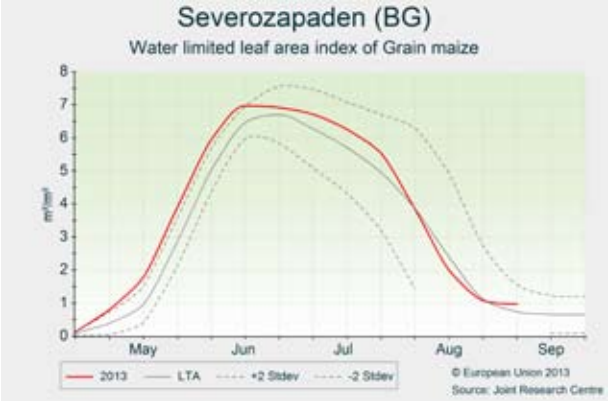
Thermal conditions were near or slightly below average in the first two dekads of July. In the subsequent period, until the end of August, the daily mean temperatures significantly exceeded the average, by +1.5-2.0°C.

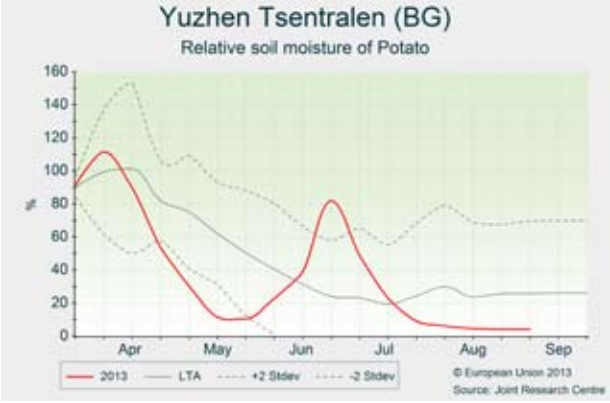
After a period of abundant rainfall in late June, the precipitation tendency decreased significantly. A long dry spell was experienced from the beginning until the end of August, with cumulated rainfall of mostly less than 10 mm.

The water supply conditions were favourable for flowering and for the first half of the grain-filling period of maize and sunflower crops. The maize crop canopy was denser than usual, whereas the leaf area extension of sunflower crops was near normal. From the beginning of August, however, our crop model simulation indicates rapid leaf senescence and restricted biomass assimilation, mainly due to water stress. Furthermore, the warm and dry weather speeded up the ripening process, and consequently, harvesting could occur 2-3 weeks earlier than usual. Even though conditions during August were not optimal, on balance good yields are forecast for maize and sunflower crops. As potatoes have shallower roots, the long dry period combined with a generalised increase in temperatures resulted in a significant decrease in the yield forecast.









Austria, the Czech Republic and Slovakia

Warmer than usual. Summer crops affected by hot and dry weather

High temperatures accelerated the development of summer crops. The grain maize yield forecast is revised downwards for the Czech Republic and Slovakia due to unfavorable weather conditions during the anthesis and grain-filling periods.

In general, warmer- and drier-than-usual conditions were experienced during July and August, yet with high temporal and spatial variability. Average air temperatures were 2-4°C above the long-term average (LTA) in the southern part of Austria and 1-2°C above LTA elsewhere. The most pronounced rainfall deficits, with rainfall between 50 and 80% below LTA, occurred in *Vychodne Slovensko* and *Stredne Slovensko* (Slovakia), *Jihovychod* (the Czech Republic) and *Burgenland* (Austria). Significant rainfall deficits also occurred in other regions of the eastern part of the Czech Republic and the eastern part of Austria. Rainfall conditions elsewhere were close to normal. Average air temperatures that were 2-6°C above the LTA were recorded during the third dekad of July and the first dekad of August. Maximum air temperatures during this period were well above 35°C for 6 to 10 days in Burgenland, the eastern part of *Niederöesterreich* and *Zapadne Slovensko*. Normal air temperature conditions prevailed during the second and third dekad of August, whereas warmer-than-usual conditions occurred in Austria and the Czech Republic during the first dekad of September. Above-average rainfall in the second half of August over central and eastern parts of Austria improved the status of soil moisture content in that region.

As a consequence of the abovementioned high temperatures, the development of summer crops was significantly accelerated. Furthermore, significant rainfall deficits in Slovakia, *Kärnten*, *Burgenland* and the eastern part of *Steiermark* in Austria caused low soil moisture levels. Drought conditions, which occurred during the sensitive period of maize anthesis and the grain-filling stage, would reduce maize yields. As a consequence, the forecasts for grain maize were revised downwards for the Czech Republic and especially for Slovakia, where the most significant rainfall deficit occurred. The forecast for sugar beet is revised slightly downwards for Slovakia and upwards for Austria. Forecasts for potato and sunflower yields remain similar to those previously reported. Winter crop forecasts are unchanged.

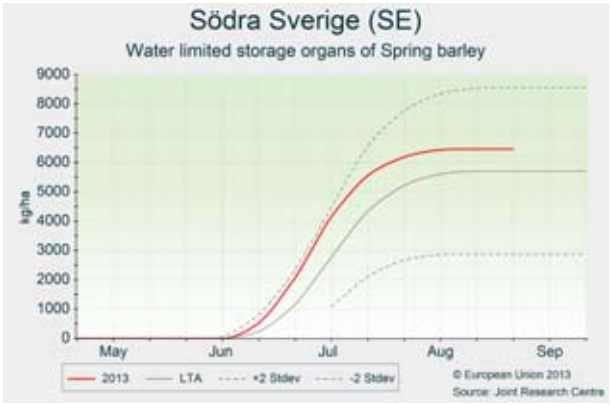
Denmark and Sweden

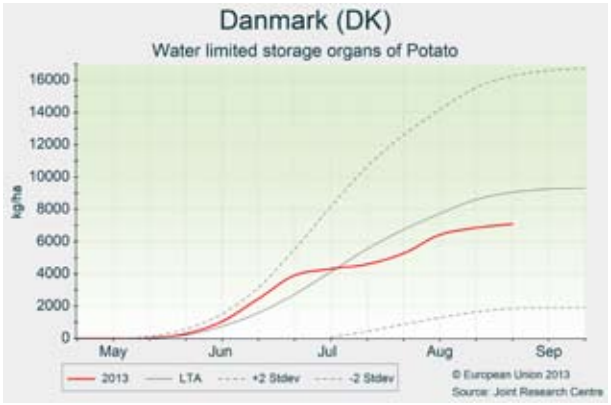
Warm and sunny summer, with a long dry spell in July

Warm and sunny summer, with a long dry spell in July. Yield forecasts for summer crops revised slightly downwards.

During the period from 1 July to 10 September, warmer-than-usual thermal conditions prevailed, with cumulated global radiation well above the average throughout the region. After the abundant precipitation recorded during the second half of June, July was one of the driest months of our climatological records, with hardly any rainfall between 1 and 23 July in Denmark and southern Sweden. After this date, until the end of the review period (10 September) rainfall returned to normal levels, thus restoring soil water content. The harvesting of winter cereals was completed in August and yields are forecast to be around the 5-year average, but rainfall during the first half of August could have hampered the harvest locally. The

long dry spell in July affected the biomass accumulation and yield formation of summer crops, as indicated by our models. Therefore, the yield forecasts for summer crops were revised slightly downwards. For spring barley, the yield forecast remains unaltered, close to the 5-year average.





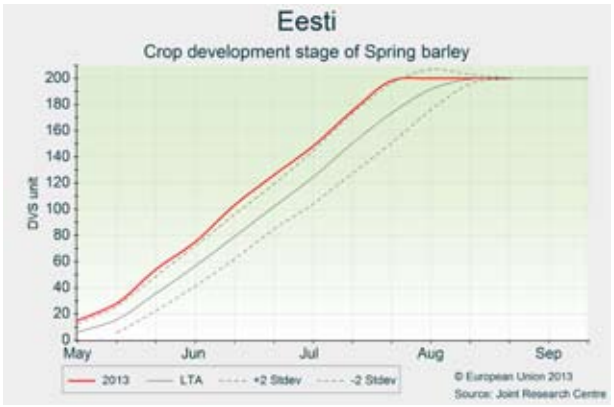
Finland and the Baltic countries

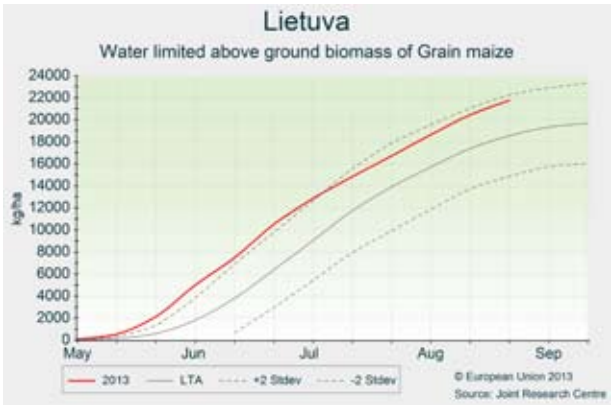
Average summer weather conditions with good yield expectations

Cereals yields are expected to be less than last year (when some countries in the region experienced all-time record yields), but above the 5-year average.

The period analysed (1 July to 10 September) was characterised by near-average temperatures in most of Finland and the Baltic countries, whereas some regions experienced slightly above-average temperature accumulation, particularly *Etelä-Suomi* and the central part of Latvia. Rainfall levels were generally around average, but in some regions, such as the central part of Estonia, western Latvia and part of northern Lithuania, rainfall accumulated over the review period was 50 to 100 mm below the long-term average. Rainfall levels during the ripening and harvesting of winter and spring cereals were around average, and harvesting of these crops proceeded normally.

The weather conditions were good for crop growth and development across the region. The yield forecast for almost all crops is above the 5-year average, but not as high as last year when all-time yield records were attained in some countries of the region. The yields for maize in Lithuania and sugar beet, particularly in Finland, are expected to be higher than last year.





Belgium, the Netherlands and Luxembourg

Continued warm and dry weather has mixed effects on crops

Predominantly warm and dry weather provided generally good conditions for the harvesting of winter crops but restrained grain filling, especially in drought-prone areas. Summer crops did not fully benefit from the warm and sunny conditions due to limited water availability. Yield forecasts for winter cereals remain mostly the same as in the July Bulletin, and close to the 5-year average. Forecasts for root crops and grain maize were revised downwards.

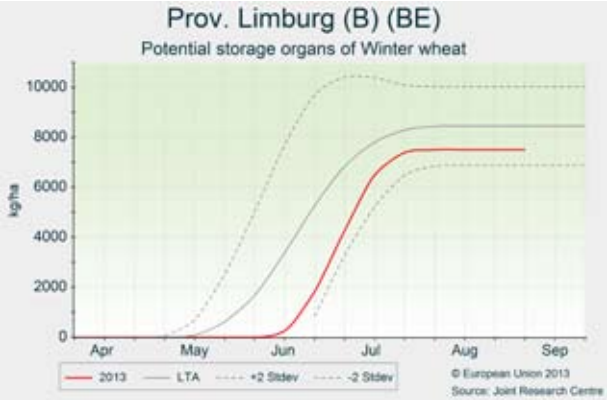
The period under review was mainly characterised by above-average temperatures and below-average rainfall.

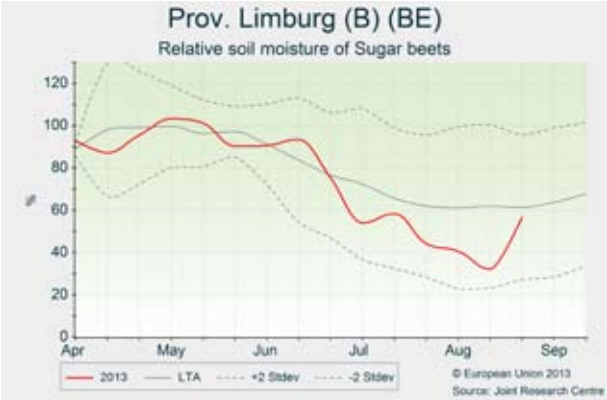
Temperatures were particularly high during the second half of July, the first week of August, and during the first week of September, with several days of maxima exceeding 30°C. Rainfall was particularly scarce during the first two dekads of July. Substantial rainfall partly restored soil moisture levels during the last dekad of July, but August and the first days of September also tended to be much dryer than usual, except for the north-eastern provinces of the Netherlands. Radiation levels cumulated over the period were well above average.

The effects of these weather conditions on crop growth and development were mixed, depending on the type of crop and development stage, and whether or not farmers had access to supplementary irrigation. The high temperatures during most of July and the beginning of August accelerated the development of winter crops during the grain-filling stage, thereby curbing the potential for high yields (mentioned as a possibility in the July Bulletin). However, the prevailing sunny and dry conditions were favourable for ripening.

The harvesting of these crops could also take place without serious setbacks. On balance, this resulted in practically unaltered forecasts compared to the July Bulletin, remaining very close to the 5-year average.

Maize, potatoes and sugar beet could potentially benefit from the high sunshine levels, but their growth was somewhat restricted in many places due to limited water availability. The forecast for these crops was revised slightly downwards and is now 3-5% below the average of the past five years.





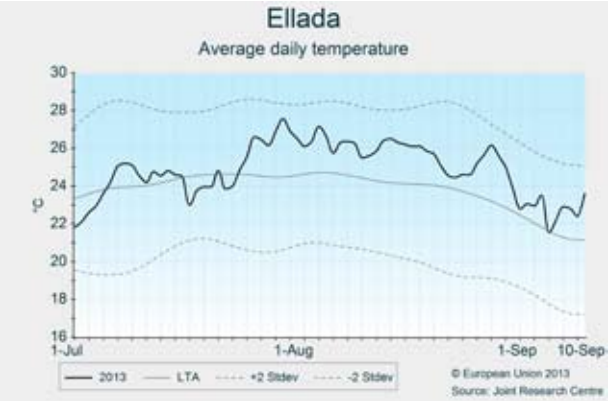
Greece and Cyprus

Summer crops maintain good yield potential

High temperatures and scarce rainfall observed for both countries. However, irrigation maintains the expected yield of summer crops.

In Greece, average daily temperatures fluctuated around the long-term average until 23 July, after which they were steadily 2-3°C higher. The temperature values since 1 January rank 2013 among the three warmest years since 1975. Of course, these conditions resulted in high temperature sums and cumulated radiation. Central and northern Greece received some rainfall on 21 and 22 of July, with lesser amounts until then, but almost no precipitation during August. A notable exception was the area of Central Macedonia (Kentriki Macedonia) which experienced rainfall during August and the first days of September. Although these dry conditions could trigger crop stress conditions, our crop forecast confirms the values of the previous bulletin as most of the summer crops are irrigated.

No rain fell in Cyprus since 1 July and the temperatures steadily fluctuated above the long-term average. Similarly to Greece, the high cumulated radiation and the temperature sums were recorded. As harvesting was completed at the beginning of summer, crop forecasts have not been altered.



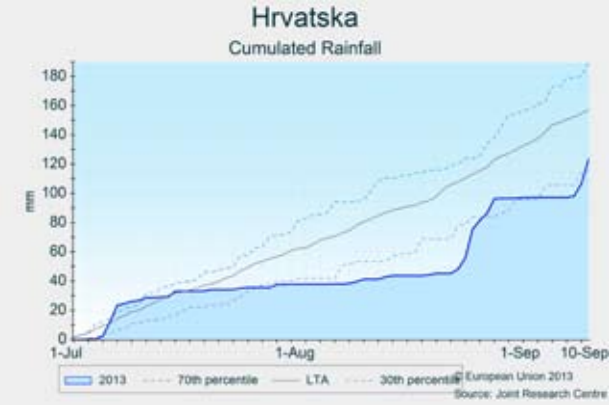
Croatia

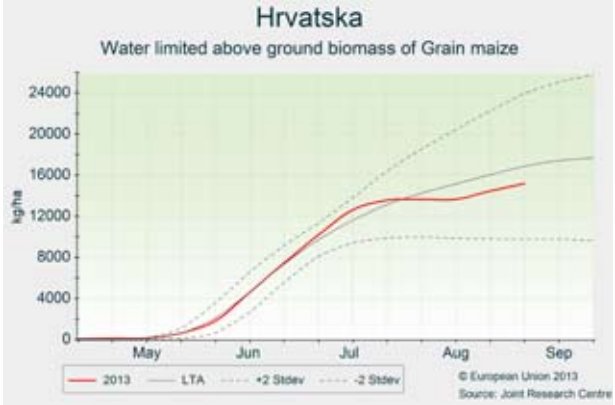
Hot and dry mid-summer

Hot and dry weather during July and August elevated crop water requirements. Soil moisture reserves were not sufficient for summer crops, grain maize in particular, which reacted with decreasing biomass production.

Air temperatures across the country were higher than the long-term average during the period analysed (1 July to 10 September). The last dekad of July and first dekad of August were very hot, with maximum temperatures predominantly above 30°C. This summer Croatia experienced a number of heat waves that lasted up to 10 days in *Kontinentalna Hrvatska* and much longer in *Jadranska Hrvatska*. High temperatures led to elevated crop water requirements. The rainfall during the period analysed, however, was significantly lower than the long-term average. These conditions led to a rapid decline of soil moisture content below the optimal level. Summer crops reacted with decreased biomass production, particularly grain maize. The significant levels of rainfall, which occurred in late August, replenished soil water and intensified biomass accumulation of these crops. The preceding dry and warm weather was favourable for harvesting of spring and winter cereals, especially for those harvested after the first dekad of July. Earlier harvesting was disturbed by increased rainfall events and moist soils.

This growing season started with an excessively wet period that was followed by drought in July and August. Nevertheless, crop growth and development were fairly good and our yield forecast for summer crops is set higher than last year when yields were affected by more severe drought. The forecast for winter and spring crops is slightly lower than last year, but still higher than the 5-year average.



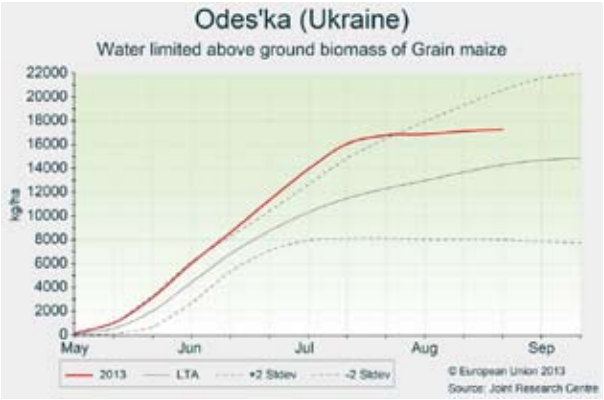


3.2 Black Sea Area

Ukraine

Good harvesting conditions

July and August were characterised by sparse rainfall in most regions. These conditions were favourable for the harvesting of wheat and barley. Considering that June was rainy, soil moisture remained sufficient for good crop development. Maize yields are expected to increase due to good conditions during flowering and grain filling.



After a warm spring (which accelerated the cycle of all major crops), thermal conditions in July and August alternated between heat waves and temperatures that were close to or slightly below average. In the south-eastern regions, average temperatures were 1.5 to 2°C above average during August. Since July, rainfall levels were slightly below average in most regions. August was dry with no significant rainfall, particularly in the region of the Black Sea where recorded rainfall levels were between 10 and 20 mm. Only a few central regions received rainfall close to the average (*Vinnyts'ka*, *Cherkas'ka*). Nevertheless, as June was particularly rainy, sufficient soil moisture for crop development during the grain-filling stage was guaranteed. On the other hand, dry conditions were optimal for harvests of barley and wheat. Substantial rainfall has been observed since the end of August, which could be favourable to maize crops.

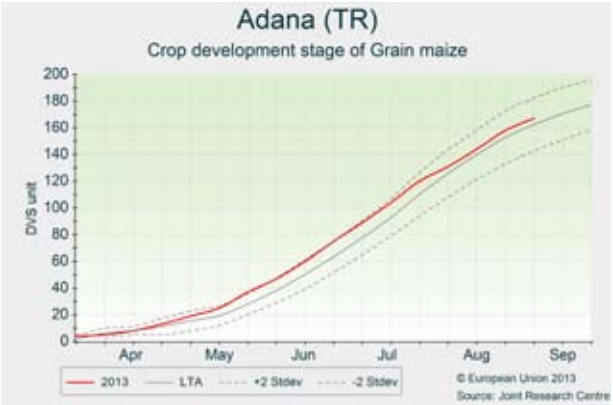
Dry conditions in the region of the Black Sea are expected to lead to a slight reduction in the yields of non-irrigated crops, whereas conditions are optimal in others regions. Thus forecasts for wheat and barley are expected to be higher than the average. Weather conditions were also ideal for maize, particularly during the flowering and grain-filling stages, and forecasted yields have been increased compared to our last Bulletin. The development stage of maize is two weeks in advance and harvesting should begin in the coming days, if not hampered by rain.

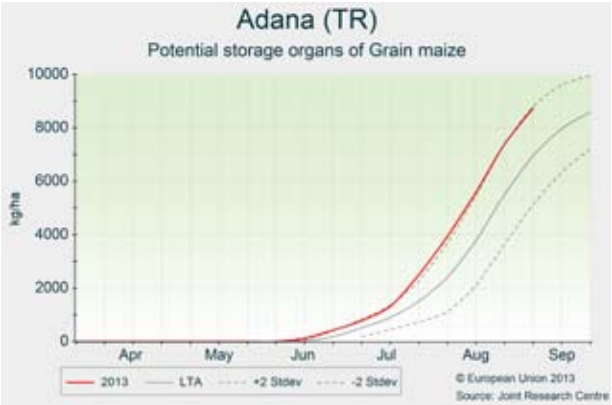
Turkey

Above-average maize yields expected

Prevailing favourable weather conditions indicate good yields for grain maize, above the 5-year average.

Favourable temperatures, solar radiation and above-average well-distributed rainfall have supported good growth and development of maize in the main production areas of Turkey. In *Adana* and *Hatay*, where most of the maize is grown, the crop is currently in the grain-filling stage, whereas in *Kocaeli* and *Zonguldak* it is in the ripening stage. As a consequence, the maize yield forecast has been revised further upwards, to above the 5-year-average value. Harvesting of winter wheat and barley was completed in the beginning of August. For both crops, the above-average yield forecast of the July and August bulletins was maintained.





3.3 European Russia and Belarus

European Russia

Abundant and persistent rain hampered the harvesting of spring cereals

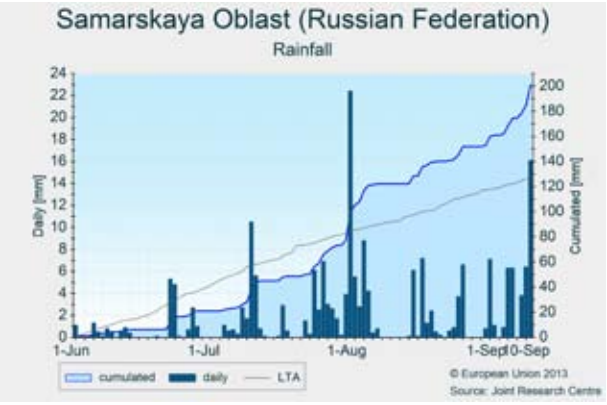
The harvesting of spring cereals was set back in Central and Near Volga Okrugs by frequent and substantial rainfall events that occurred since the end of July. Suboptimal soil moisture during the flowering and grain-filling phases had already lowered the yield expectations for these crops, especially in Near Volga and Southern Okrugs, as well as in the southern part of the Central District. In the northern regions of Russia the yield outlook is quite positive. The yield of maize is expected to be higher than last year.

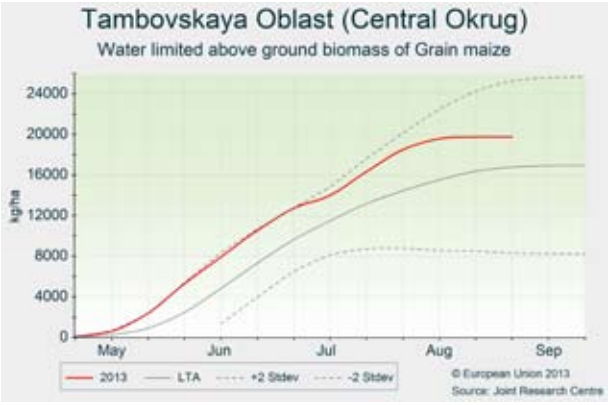
Thermal conditions were near normal for the whole of July, but i this resulted from the aggregation of a warm first and relatively cold last dekad of the month. August and the first dekad of September were warmer than usual in many areas with a positive anomaly of 1 to 2°C. Daily temperatures remained close to the long-term average in the regions along the Ukrainian border and north of the Caucasus Mountains.

While scattered and locally abundant rainfall was experienced in several parts of southern Russia, weather conditions were generally dryer than usual, facilitating the harvesting of winter wheat and barley. Drought occurred primarily in the *Near Volga Okrug* and *Rostovskaya Oblast* (Southern District) due to below-average precipitation and intensive evapotranspiration since the end of May. The climatic water balance was 100 to 200 mm lower than usual in these regions. The water deficit adversely affected the growth and yield formation of spring barley. Satellite-based crop growth and biomass indicators (e.g. anomalies in cumulative NDVI and fAPAR) confirm this unfavourable situation since the second half of June.

In the *Central* and *Near Volga Okrugs*, abundant and widespread rains from the last dekad of July until mid-August hampered the harvesting of spring cereals, resulting in increased harvesting losses and decreased grain quality.

Grain maize shows high biomass accumulation in the *Central Okrug*, but in the *Southern Okrug* the picture is mixed. In *Rostovskaya Oblast* there are clearly visible signs of restricted growth due to water scarcity, but in the other regions of the Southern District growth appears to be near or above average.





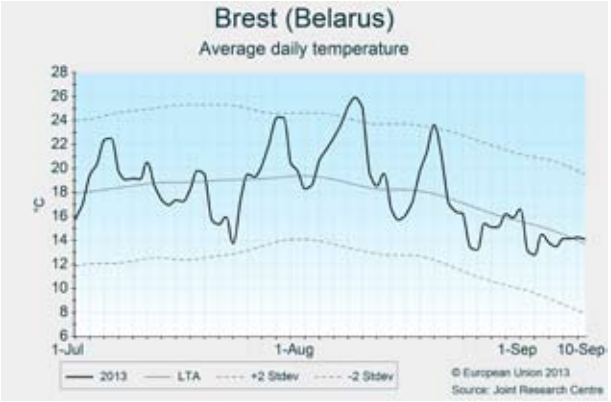
Belarus

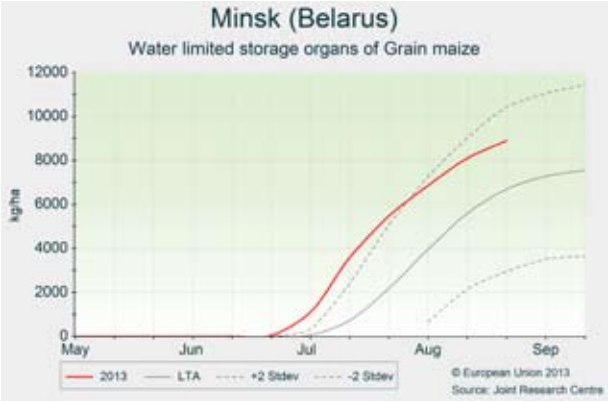
Favourable conditions for ripening and harvesting

Since the end of July, warm and dry conditions have favoured the harvesting of barley and wheat. Optimal conditions prevailed since the start of the season, and barley, wheat and maize yields are forecasted to be higher than the average.

After an exceptionally warm spring, summer thermal conditions were full of contrasts. July was mainly characterised by temperatures close to the average and substantial rainfall. Since the last dekad of July, however, warm spells and scarce

rainfall prevailed, with a positive impact on crops. Indeed wheat and barley were ripening and close to maturity. Thus harvesting took place under good conditions and the higher-than-average yield forecasts for wheat and barley are maintained. The warm spells that occurred since the end of July were also favourable to maize growth. According to our model, maize has already reached maturity and is two weeks in advance compared to an average year. Therefore, and considering also the good start of the season characterised by warm temperatures, the maize yield forecast is also maintained above the 5-year average.





4. Crop yield forecasts and yield maps

Country	TOTAL WHEAT (t/ha)					SOFT WHEAT (t/ha)					DURUM WHEAT (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU28	5.18	**5.51**	5.37	+6.4	+2.5	5.41	**5.76**	5.63	+6.3	+2.3	3.12	**3.30**	3.20	+5.6	+3.1
AT	4.14	**5.42**	5.13	+30.9	+5.7	4.19	**5.46**	5.17	+30.2	+5.5	3.07	**4.53**	4.34	+47.9	+4.4
BE	8.45	**8.70**	8.77	+2.9	-0.9	8.45	**8.70**	8.77	+2.9	-0.9	-	**-**	-	-	-
BG	3.76	**4.07**	3.71	+8.2	+9.8	3.78	**4.08**	3.70	+8.0	+10.1	2.68	**3.70**	3.85	+37.7	-4.1
CY	2.24	**2.11**	2.90	-6.0	-27.2	-	**-**	-	-	-	2.24	**2.11**	2.90	-6.0	-27.2
CZ	4.32	**5.42**	5.22	+25.6	+3.9	4.32	**5.42**	5.22	+25.6	+3.9	-	**-**	-	-	-
DE	7.33	**7.98**	7.49	+8.9	+6.6	7.34	**7.99**	7.50	+8.8	+6.5	-	**-**	-	-	-
DK	7.37	**7.20**	7.27	-2.3	-1.0	7.37	**7.20**	7.27	-2.3	-1.0	-	**-**	-	-	-
EE	3.90	**3.35**	3.13	-14.1	+7.1	3.90	**3.35**	3.13	-14.1	+7.1	-	**-**	-	-	-
ES	2.35	**3.55**	2.93	+51.4	+21.3	2.64	**3.75**	3.19	+41.8	+17.5	1.08	**2.68**	2.06	+148.4	+30.3
FI	3.93	**3.84**	3.77	-2.3	+1.8	3.93	**3.84**	3.77	-2.3	+1.8	-	**-**	-	-	-
FR	7.15	**7.03**	7.02	-1.6	+0.1	7.30	**7.15**	7.19	-2.0	-0.5	5.45	**5.26**	5.06	-3.4	+3.9
GR	2.42	**2.64**	2.74	+8.9	-3.9	2.83	**2.71**	2.99	-4.1	-9.4	2.31	**2.62**	2.66	+13.3	-1.8
HR	5.35	**4.96**	4.86	-7.3	+2.0	5.35	**4.96**	4.86	-7.3	+2.0	-	**-**	-	-	-
HU	3.73	**4.54**	4.10	+21.5	+10.8	3.73	**4.54**	4.10	+21.7	+10.9	3.70	**4.07**	3.80	+9.7	+7.0
IE	6.31	**8.34**	8.39	+32.3	-0.6	6.31	**8.34**	8.39	+32.3	-0.6	-	**-**	-	-	-
IT	4.13	**3.86**	3.83	-6.6	+0.8	5.89	**5.28**	5.39	-10.4	-2.0	3.32	**3.21**	3.14	-3.4	+2.0
LT	4.78	**4.16**	3.99	-13.1	+4.2	4.78	**4.16**	3.99	-13.1	+4.2	-	**-**	-	-	-
LU	5.87	**6.19**	6.12	+5.6	+1.2	5.87	**6.19**	6.12	+5.6	+1.2	-	**-**	-	-	-
LV	4.37	**3.76**	3.64	-13.9	+3.3	4.37	**3.76**	3.64	-13.9	+3.3	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	8.52	**8.60**	8.65	+1.0	-0.5	8.52	**8.60**	8.65	+1.0	-0.5	-	**-**	-	-	-
PL	4.14	**4.26**	4.18	+2.8	+1.8	4.14	**4.26**	4.18	+2.8	+1.8	-	**-**	-	-	-
PT	1.19	**2.20**	1.55	+85.2	+42.3	1.19	**2.20**	1.55	+85.2	+42.3	-	**-**	-	-	-
RO	2.61	**3.43**	2.96	+31.3	+15.8	2.61	**3.43**	2.96	+31.3	+15.8	-	**-**	-	-	-
SE	6.26	**5.85**	5.84	-6.5	+0.1	6.26	**5.85**	5.84	-6.5	+0.1	-	**-**	-	-	-
SI	5.43	**4.63**	4.78	-14.9	-3.2	5.43	**4.63**	4.78	-14.9	-3.2	-	**-**	-	-	-
SK	3.29	**4.05**	4.04	+23.2	+0.3	3.30	**4.03**	4.03	+22.2	+0.0	2.72	**4.42**	4.13	+62.4	+7.2
UK	6.66	**7.73**	7.66	+16.1	+1.0	6.66	**7.73**	7.66	+16.1	+1.0	-	**-**	-	-	-

Country	TOTAL BARLEY (t/ha)					SPRING BARLEY (t/ha)					WINTER BARLEY (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU28	4.39	**4.84**	4.39	+10.3	+10.3	3.93	**4.41**	3.83	+12.2	+15.1	5.20	**5.51**	5.25	+5.8	+4.8
AT	4.40	**5.16**	4.86	+17.3	+6.3	3.44	**4.25**	4.13	+23.4	+2.8	5.29	**5.91**	5.61	+11.6	+5.4
BE	8.21	**8.40**	8.48	+2.3	-1.0	-	**-**	-	-	-	8.21	**8.40**	8.48	+2.3	-1.0
BG	3.47	**3.81**	3.66	+9.8	+4.2	-	**-**	-	-	-	3.47	**3.81**	3.66	+9.8	+4.2
CY	1.71	**1.41**	1.65	-17.5	-14.4	-	**-**	-	-	-	1.71	**1.41**	1.65	-17.5	-14.4
CZ	4.23	**4.37**	4.39	+3.4	-0.4	4.31	**4.32**	4.33	+0.1	-0.3	3.98	**4.49**	4.54	+12.7	-1.1
DE	6.19	**6.40**	6.11	+3.3	+4.7	5.64	**5.31**	5.09	-5.8	+4.4	6.49	**6.72**	6.48	+3.4	+3.7
DK	5.61	**5.31**	5.32	-5.3	-0.2	5.49	**5.20**	5.17	-5.2	+0.7	6.37	**5.90**	5.94	-7.5	-0.8
EE	3.13	**2.65**	2.65	-15.2	+0.2	3.13	**2.65**	2.65	-15.2	+0.2	-	**-**	-	-	-
ES	2.23	**3.92**	2.74	+75.5	+43.1	2.27	**3.94**	2.80	+73.2	+40.7	2.00	**3.80**	2.41	+89.9	+57.4
FI	3.48	**3.78**	3.41	+8.6	+11.0	3.48	**3.78**	3.41	+8.6	+11.0	-	**-**	-	-	-
FR	6.74	**6.60**	6.48	-2.1	+1.8	6.64	**6.50**	6.23	-2.2	+4.3	6.80	**6.64**	6.6	-2.3	+0.7
GR	2.48	**2.45**	2.62	-1.3	-6.5	-	**-**	-	-	-	2.48	**2.45**	2.62	-1.3	-6.5
HR	4.25	**4.19**	4.03	-1.4	+4.0	-	**-**	-	-	-	4.25	**4.19**	4.03	-1.4	+4.0
HU	3.61	**4.13**	3.71	+14.4	+11.3	3.21	**3.47**	3.31	+7.9	+4.8	3.83	**4.39**	3.96	+14.5	+10.9
IE	5.98	**7.00**	6.82	+17.1	+2.5	5.70	**6.67**	6.54	+17.1	+2.0	7.00	**8.25**	8.34	+17.8	-1.1
IT	3.77	**3.58**	3.58	-5.0	+0.0	-	**-**	-	-	-	3.77	**3.58**	3.58	-5.0	+0.0
LT	3.38	**3.06**	2.98	-9.6	+2.7	3.38	**3.06**	2.98	-9.6	+2.7	-	**-**	-	-	-
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	2.83	**2.53**	2.56	-10.6	-1.0	2.83	**2.53**	2.56	-10.6	-1.0	-	**-**	-	-	-
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	5.70	**5.98**	6.02	+5.0	-0.6	5.70	**5.98**	6.02	+5.0	-0.6	-	**-**	-	-	-
PL	3.60	**3.55**	3.30	-1.5	+7.5	3.56	**3.36**	3.15	-5.7	+6.7	3.85	**4.09**	3.98	+6.2	+2.6
PT	1.27	**2.10**	1.63	+66.0	+29.1	-	**-**	-	-	-	1.27	**2.10**	1.63	+66.0	+29.1
RO	2.36	**2.96**	2.70	+25.5	+9.9	1.84	**2.17**	2.01	+17.7	+7.7	2.64	**3.38**	3.09	+28.0	+9.4
SE	4.60	**4.52**	4.36	-1.7	+3.8	4.55	**4.49**	4.32	-1.3	+4.1	6.63	**5.41**	5.41	-18.4	+0.1
SI	4.72	**4.33**	4.21	-8.2	+2.9	-	**-**	-	-	-	4.72	**4.33**	4.21	-8.2	+2.9
SK	3.18	**3.45**	3.49	+8.4	-1.2	3.19	**3.43**	3.48	+7.6	-1.4	3.12	**3.56**	3.59	+13.8	-1.1
UK	5.51	**5.74**	5.73	+4.1	+0.1	4.97	**5.44**	5.31	+9.5	+2.5	6.38	**6.62**	6.40	+3.9	+3.5

Country	GRAIN MAIZE (t/ha)					RYE (t/ha)					TRITICALE (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU28	6.05	**6.88**	6.98	+13.8	-1.5	3.68	**3.71**	3.33	+0.9	+11.5	4.17	**4.25**	4.06	+1.8	+4.6
AT	10.70	**10.90**	10.68	+1.8	+2.1	4.23	**3.73**	4.02	+11.9	-7.3	5.04	**5.02**	5.06	-0.3	-0.8
BE	10.92	**11.29**	11.77	+3.4	-4.0	-	**-**	-	-	-	-	**-**	-	-	-
BG	3.68	**5.76**	4.77	+56.7	+20.8	-	**-**	-	-	-	2.45	**3.07**	3.11	+25.0	-1.4
CY	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
CZ	7.78	**7.67**	7.82	-1.4	-1.9	4.78	**4.00**	4.50	-16.2	-11.0	4.31	**4.28**	4.26	-0.6	+0.6
DE	10.48	**9.62**	9.94	-8.2	-3.2	5.47	**5.63**	4.99	+2.8	+12.8	6.18	**6.39**	5.82	+3.4	+9.9
DK	5.82	**-**	5.28	-	-	5.95	**5.50**	5.30	-7.6	+3.9	5.21	**5.22**	5.13	+0.2	+1.7
EE	-	**-**	-	-	-	3.39	**2.84**	2.65	-16.1	+7.4	-	**-**	-	-	-
ES	10.83	**10.95**	10.56	+1.1	+3.7	1.60	**2.21**	1.98	+38.0	+11.9	1.76	**2.56**	2.26	+45.4	+13.6
FI	-	**-**	-	-	-	3.18	**2.70**	2.76	-15.0	-2.3	-	**-**	-	-	-
FR	8.91	**9.01**	9.19	+1.1	-1.9	5.08	**4.92**	4.93	-3.2	-0.2	5.53	**5.42**	5.40	-2.1	+0.4
GR	10.61	**10.73**	10.79	+1.1	-0.6	2.11	**2.34**	2.08	+11.0	+12.5	-	**-**	-	-	-
HR	4.34	**6.40**	6.46	+47.6	-0.9	-	**-**	-	-	-	4.18	**4.03**	3.74	-3.6	+7.9
HU	3.98	**5.21**	6.17	+30.7	-15.6	2.24	**2.59**	2.20	+15.6	+17.9	3.11	**4.06**	3.27	+30.5	+24.2
IE	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
IT	8.36	**8.66**	9.15	+3.6	-5.4	-	**-**	-	-	-	-	**-**	-	-	-
LT	6.11	**7.62**	5.77	+24.8	+32.2	2.80	**2.55**	2.35	-8.9	+8.6	3.65	**3.06**	2.97	-16.3	+3.0
LU	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
LV	-	**-**	-	-	-	3.42	**3.07**	3.03	-10.2	+1.2	3.70	**2.76**	2.68	-25.3	+3.2
MT	-	**-**	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-
NL	11.67	**11.66**	12.00	-0.1	-2.8	-	**-**	-	-	-	-	**-**	-	-	-
PL	7.35	**7.03**	6.51	-4.3	+8.0	2.70	**2.65**	2.51	-2.0	+5.4	3.38	**3.57**	3.41	+5.7	+4.6
PT	8.32	**8.12**	7.27	-2.4	+11.6	0.93	**0.99**	0.93	+6.2	+7.0	1.15	**1.69**	1.38	+47.3	+22.6
RO	2.16	**3.95**	3.53	+82.3	+11.7	-	**-**	-	-	-	2.93	**3.24**	3.02	+10.5	+7.0
SE	-	**-**	-	-	-	6.35	**5.86**	5.82	-7.8	+0.6	5.92	**4.99**	5.03	-15.7	-0.9
SI	7.01	**6.93**	7.88	-1.2	-12.1	-	**-**	-	-	-	-	**-**	-	-	-
SK	5.51	**5.26**	6.70	-4.5	-21.4	3.15	**2.76**	2.90	-12.3	-4.8	3.08	**2.75**	3.05	-10.9	-9.9
UK	-	**-**	-	-	-	-	**-**	-	-	-	3.50	**4.06**	4.02	+16.0	+1.1

Country	RAPE AND TURNIP RAPE (t/ha)					POTATO (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU28	3.11	**3.09**	3.04	-0.4	+1.8	30.55	**31.35**	30.57	+2.6	+2.5
AT	2.67	**2.58**	3.06	-3.5	-15.9	30.55	**32.52**	32.51	+6.5	+0.0
BE	3.84	**4.02**	4.08	+4.6	-1.5	41.96	**43.51**	45.04	+3.7	-3.4
BG	2.02	**2.65**	2.33	+31.2	+13.8	10.15	**13.70**	15.10	+34.9	-9.3
CY	-	**-**	-	-	-	-	**-**	-	-	-
CZ	2.76	**3.22**	2.90	+16.8	+11.1	27.98	**29.15**	27.01	+4.2	+7.9
DE	3.69	**3.80**	3.71	+2.9	+2.4	44.76	**42.21**	43.69	-5.7	-3.4
DK	3.75	**3.48**	3.64	-7.1	-4.2	42.13	**40.60**	39.98	-3.6	+1.6
EE	1.89	**1.69**	1.59	-10.4	+6.7	-	**-**	-	-	-
ES	1.8	**2.11**	1.81	+17.2	+16.7	30.06	**31.50**	29.71	+4.8	+6.0
FI	1.28	**1.30**	1.36	+2.0	-3.9	23.65	**27.33**	26.37	+15.5	+3.6
FR	3.41	**3.11**	3.45	-8.7	-9.7	40.87	**41.46**	43.28	+1.4	-4.2
GR	**-**	**-**	**-**	-	-	23.96	**26.60**	25.30	+11.0	+5.1
HR	2.67	**2.64**	2.62	-1.2	+0.6	14.73	**18.75**	16.56	+27.3	+13.2
HU	2.46	**2.69**	**2.33**	+9.4	+15.7	23.13	**24.72**	25.46	+6.9	-2.9
IE	-	**-**	-	-	-	-	**-**	-	-	-
IT	2.38	**2.32**	2.29	-2.7	+0.9	25.43	**25.00**	24.90	-1.7	+0.4
LT	2.43	**2.20**	2.05	-9.5	+7.5	17.11	**15.82**	14.95	-7.6	+5.8
LU	-	**-**	-	-	-	-	**-**	-	-	-
LV	2.65	**2.29**	2.25	-13.7	+1.9	19.57	**17.59**	17.61	-10.1	-0.1
MT	**-**	**-**	**-**	-	-	-	**-**	-	-	-
NL	-	**-**	-	-	-	45.18	**43.37**	45.43	-4.0	-4.5
PL	2.59	**2.98**	2.60	+15.0	+14.5	24.24	**23.11**	21.36	-4.7	+8.2
PT	-	**-**	-	-	-	17.79	**15.98**	15.94	-10.2	+0.2
RO	1.60	**1.96**	1.70	+22.2	+15.2	10.76	**13.03**	14.09	+21.1	-7.5
SE	2.94	**2.80**	2.80	-4.9	-0.3	32.55	**31.52**	31.58	-3.2	-0.2
SI	-	**-**	-	-	-	-	**-**	-	-	-
SK	1.99	**2.55**	2.24	+28.3	+14.1	-	**-**	-	-	-
UK	3.40	**3.32**	3.47	-2.2	-4.3	35.00	**41.46**	41.45	+18.4	+0.0

Country	SUGAR BEETS (t/ha)					SUNFLOWER (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
EU28	69.65	**69.66**	69.71	+0.0	-0.1	1.68	**1.88**	1.84	+12.4	+2.4
AT	63.22	**67.27**	69.88	+6.4	-3.7	2.27	**2.52**	2.69	+11.2	-6.0
BE	78.93	**75.87**	79.44	-3.9	-4.5	-	-	-	-	-
BG	-	-	-	-	-	1.78	**2.06**	1.91	+15.7	+7.9
CY	-	-	-	-	-	-	-	-	-	-
CZ	63.26	**62.04**	59.91	-1.9	+3.6	2.31	**2.42**	2.35	+4.9	+2.9
DE	68.86	**67.72**	67.47	-1.6	+0.4	2.38	**2.08**	2.13	-12.5	-2.0
DK	64.92	**62.19**	60.52	-4.2	+2.8	-	-	-	-	-
EE	-	-	-	-	-	-	-	-	-	-
ES	88.71	**93.46**	85.60	+5.4	+9.2	0.81	**1.11**	1.10	+37.0	+0.5
FI	34.67	**40.90**	38.38	+18.0	+6.6	-	-	-	-	-
FR	86.56	**87.35**	88.58	+0.9	-1.4	2.32	**2.34**	2.42	+0.9	-3.5
GR	54.02	**62.13**	63.73	+15.0	-2.5	2.59	**2.54**	1.91	-2.1	+32.6
HR	39.11	**57.88**	51.14	+48.0	+13.2	2.68	**3.22**	2.70	+20.2	+19.1
HU	43.86	**49.92**	54.52	+13.8	-8.4	2.15	**2.29**	2.29	+6.5	-0.2
IE	-	-	-	-	-	-	-	-	-	-
IT	54.92	**53.43**	56.14	-2.7	-4.8	1.66	**2.22**	2.13	+33.6	+4.2
LT	52.24	**52.41**	46.49	+0.3	+12.7	-	-	-	-	-
LU	-	-	-	-	-	-	-	-	-	-
LV	-	-	-	-	-	-	-	-	-	-
MT	-	-	-	-	-	-	-	-	-	-
NL	78.86	**74.92**	76.95	-5.0	-2.6	-	-	-	-	-
PL	58.25	**56.75**	52.94	-2.6	+7.2	-	-	-	-	-
PT	-	-	-	-	-	0.53	**0.58**	0.57	+8.5	+1.2
RO	26.93	**35.10**	34.76	+30.3	+1.0	1.37	**1.64**	1.55	+19.8	+6.1
SE	55.78	**56.14**	56.99	+0.6	-1.5	-	-	-	-	-
SI	-	-	-	-	-	-	-	-	-	-
SK	45.41	**50.07**	56.35	+10.3	-11.1	2.19	**2.09**	2.21	-4.4	-5.4
UK	70.00	**66.84**	67.72	-4.5	-1.3	-	-	-	-	-

Notes: Yields are forecast for target crops with more than 10000 ha per country
Sources: 2008-2013 data come from DG AGRICULTURE short term Outlook data (dated August 2013, received on 30/08/2013), EUROSTAT Eurobase (last update: 27/08/2013) and EES (last update: 15/08/2013)
2013 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/09/2013)

Country	WHEAT (t/ha)					BARLEY (t/ha)					GRAIN MAIZE (t/ha)				
	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs	2012	2013	Avg 5yrs	%13/12	%13/5yrs
BY	3.50	**3.59**	3.44	+2.7	+4.5	3.23	**3.31**	3.24	+2.4	+2.1	5.26	**5.92**	5.17	+12.6	+14.5
DZ	1.76	**1.72**	1.50	-2.5	+15.0	1.54	**1.65**	1.36	+7.0	+21.7	-	-	-	-	-
MA	1.24	**2.10**	1.67	+69.7	25.2	0.63	**1.24**	1.13	+96.7	+9.5	-	-	-	-	-
TN	1.93	**1.55**	1.86	-19.5	-16.3	1.16	**0.94**	1.26	-18.6	-25.0	-	-	-	-	-
TR	2.67	**2.53**	2.52	-5.4	+0.4	2.58	**2.51**	2.42	-2.7	+3.9	7.38	**7.42**	7.23	+0.5	+2.6
UA	2.80	**3.05**	3.12	+8.9	-2.3	2.11	**2.26**	2.39	+7.1	-5.4	4.79	**5.48**	5.09	+14.4	+7.6

Notes: Yields are forecast for crops with more than 10000 ha per country
Sources: 2008-2013 data come from FAO, PSD-online, INRA Maroc, Min AGRI Tunisia and DSASI Algeria
2013 yields come from MARS CROP YIELD FORECASTING SYSTEM (CGMS output up to 10/09/2013)

Yield maps

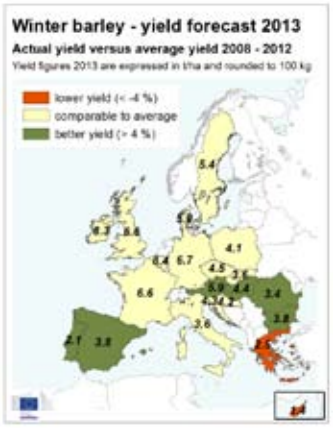

Total wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

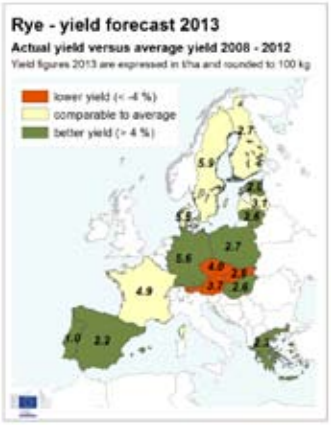

Durum wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Soft wheat - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

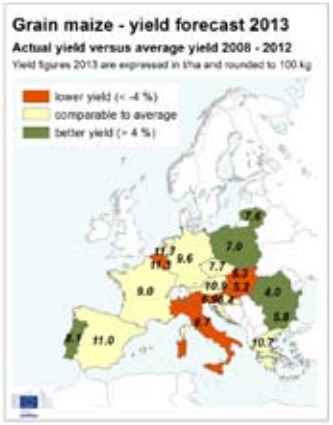

Total barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

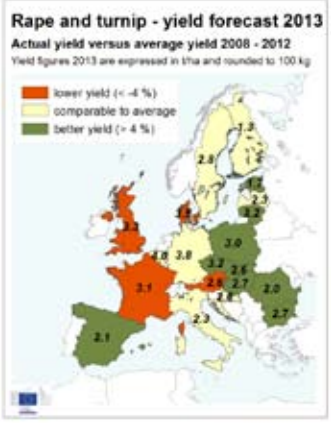

Spring barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

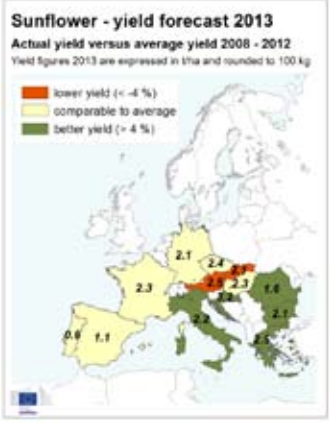

Winter barley - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Rye - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Triticale - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Grain maize - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)


Rape and turnip - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

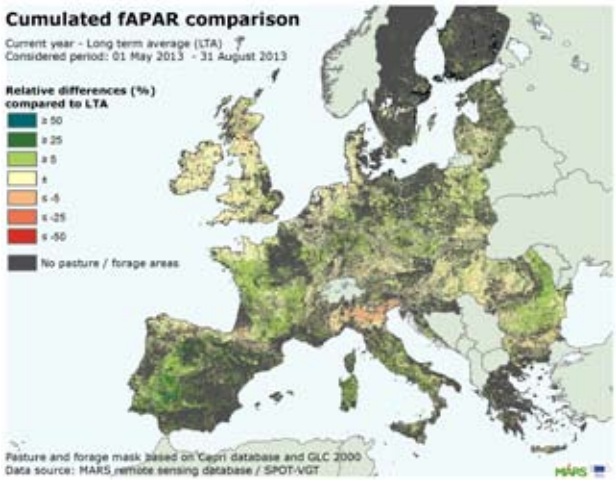

Sunflower - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

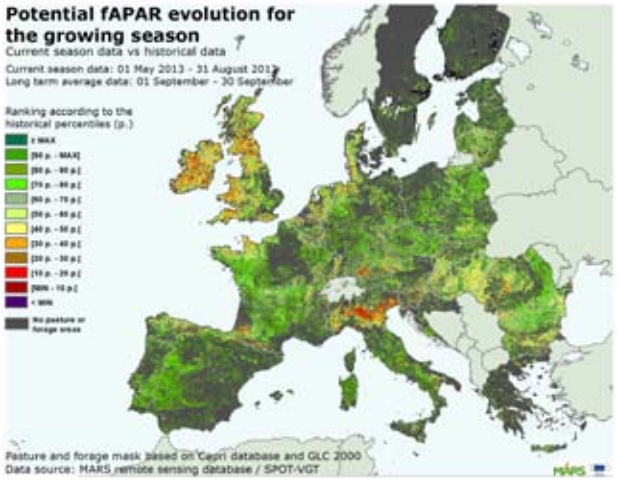

Sugar beets - yield forecast 2013
Actual yield versus average yield 2008 - 2012
Yield figures 2013 are expressed in t/ha and rounded to 100 kg
lower yield (< -4 %)
comparable to average
better yield (> 4 %)

5. Pastures in Europe – update remote sensing monitoring

Water stress induces early senescence in central Europe and Black Sea Area

In northern and western Europe, biomass production in grasslands is significantly higher than average due to favourable weather conditions. By contrast, the lack of rainfall during the second half of August has negatively affected pastures in central Europe, Hungary and Romania.





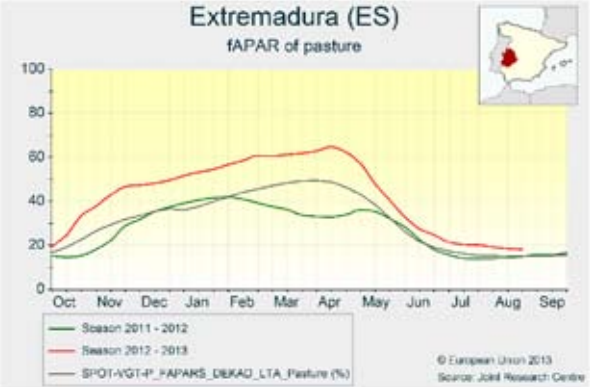
The current season has been positive for **Spain** and **Portugal**. Biomass production levels are the highest of the past 15 years in the *Dehesa* area (the south-west of the Iberian Peninsula). In northern Spain, biomass formation in grasslands during August has been similar to that of an average year. The outlook for the rest of the season is positive. Expectations for fodder maize in northern **Italy** remain below average. The drastic reduction in crop yield potential due to unfavourable weather has not been fully recovered in August, despite warmer than usual temperatures and intermittent rainfall.

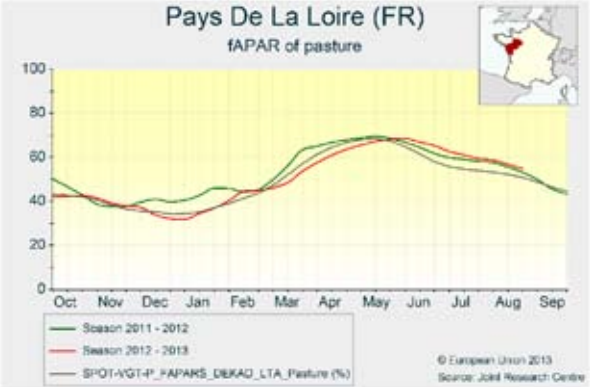
In **France**, biomass in almost all regions is substantially higher than average. The outlook is positive, thanks to warm temperatures and abundant rainfalls received during most of the summer. Expectations are also favourable for the **Benelux**, where biomass accumulation is slightly higher than usual. Temperatures above the average during August and the first week of September have led to increased biomass production in western and northern **UK**, whereas grasslands biomass levels in **Ireland** are slightly below seasonal values.

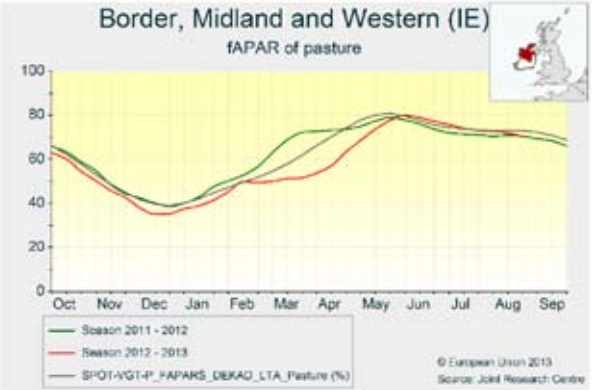
In northern **Germany** and **Denmark**, favourable weather conditions during the summer period led to the recuperation of the delay in growth that initiated in spring. Biomass accumulation during August has been above average in these regions, and the outlook for the rest of the season is positive.

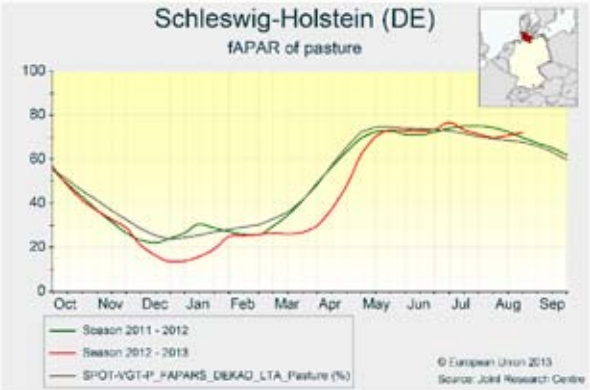
In southern **Germany**, **Austria**, the **Czech Republic** and **Slovakia**, rainfall during the second half of August partially mitigated the incipient senescence observed some weeks before, leading to a slight increase in biomass formation. By contrast, early senescence of pastures remains persistent in **Hungary**, where the latest rainfall at the end of August was not sufficient to alleviate the long dry period observed during the summer period. In **Romania**, pastures were also moderately damaged by water stress in August. However, abundant precipitation since early September (about 40 mm in 10 days) is expected to have a positive effect on grasslands and fodder maize.

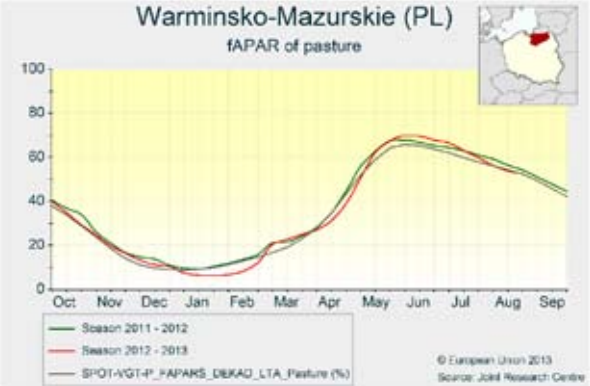
In **Poland** and the **Baltic** countries, temperatures and precipitation remained close to seasonal values during the second half of August and the first dekad of September. Biomass growth remains above average, with a positive outlook for the rest of the season.

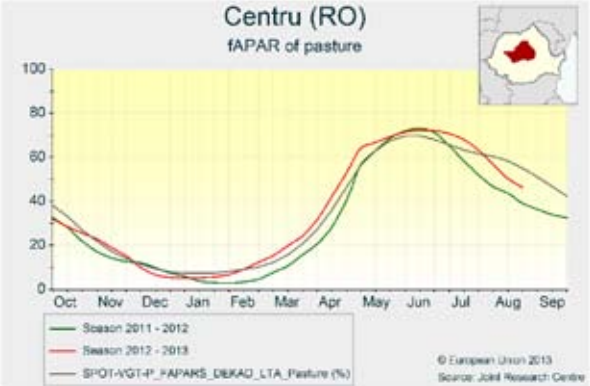

Extremadura (ES)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre


Pays De La Loire (FR)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre


Border, Midland and Western (IE)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre

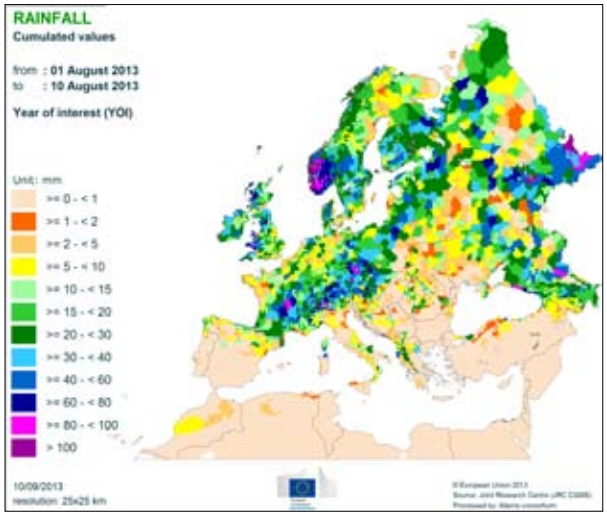

Schleswig-Holstein (DE)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre

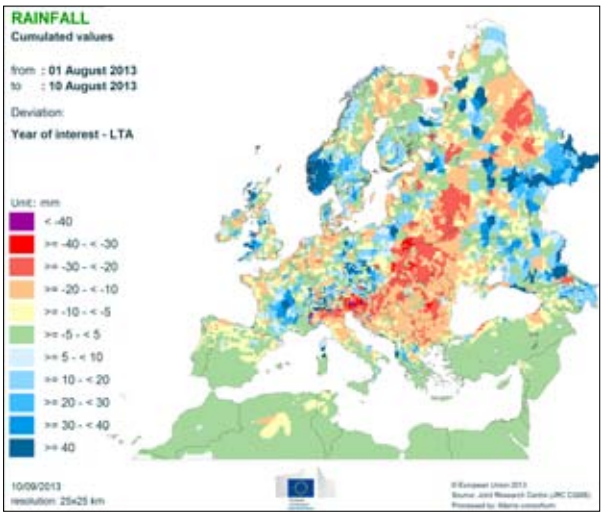

Warminsko-Mazurskie (PL)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre

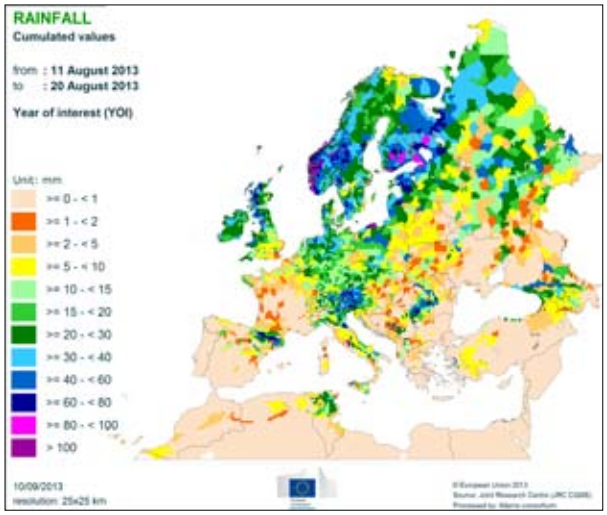

Centru (RO)
fAPAR of pasture
100
80
60
40
20
0
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
Season 2011 - 2012
Season 2012 - 2013
SPOT-VGT-4*_FAPAR5_DEKAD_LTA_Pasture (%)
© European Union 2013
Source: Joint Research Centre

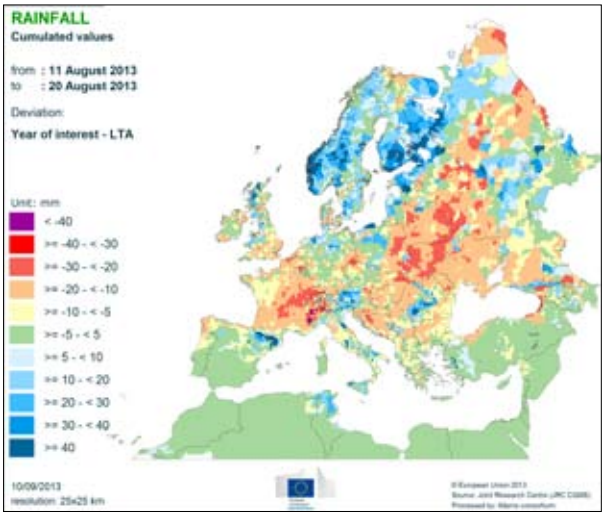
6. Atlas maps

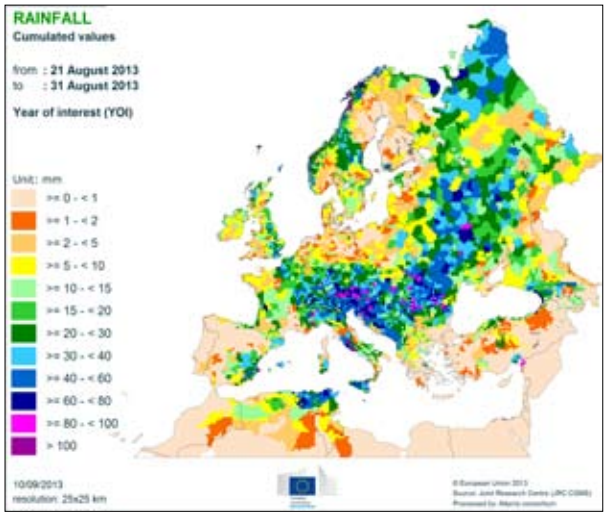
Precipitation and rainy days

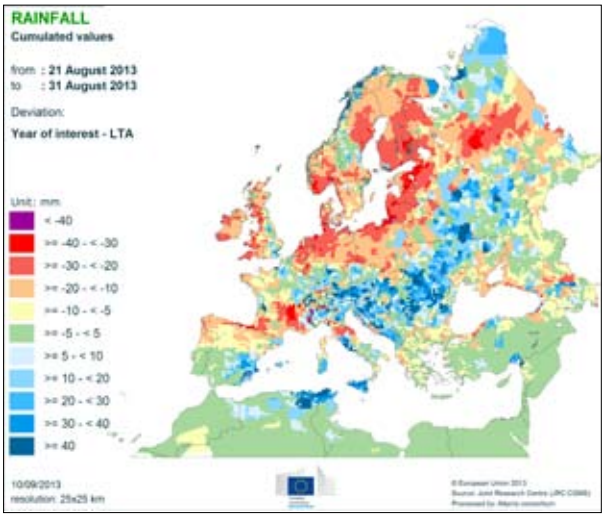


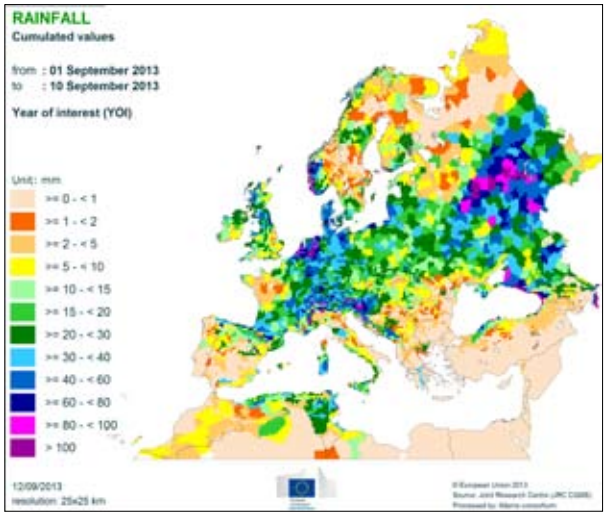


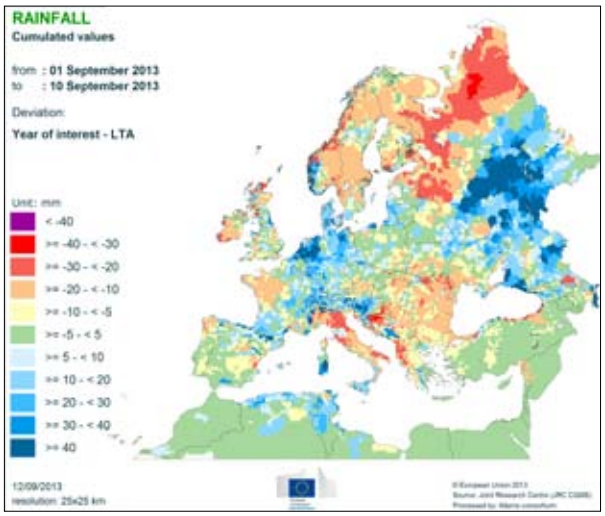


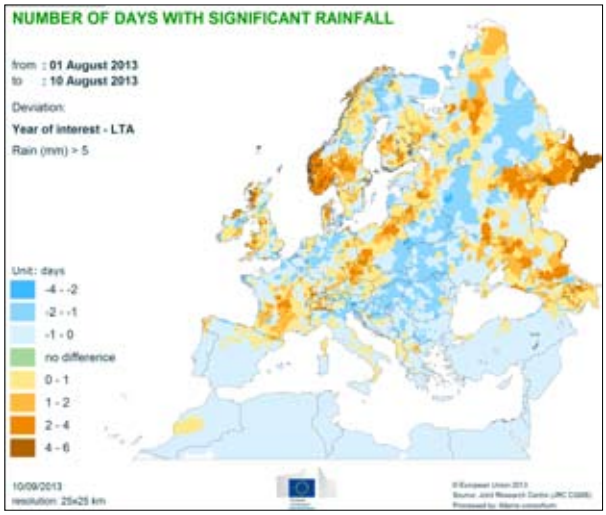


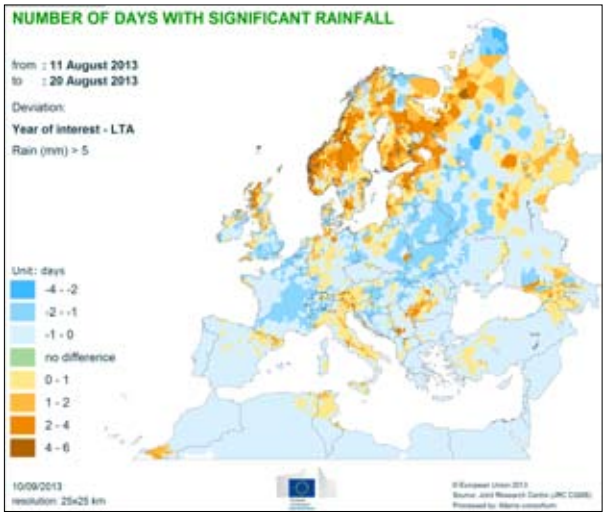


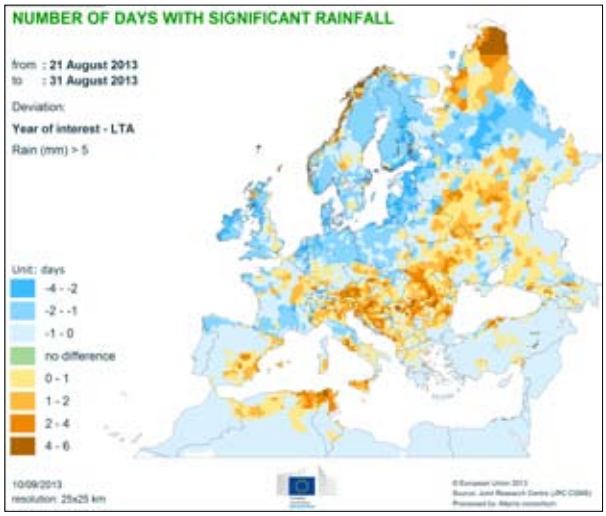


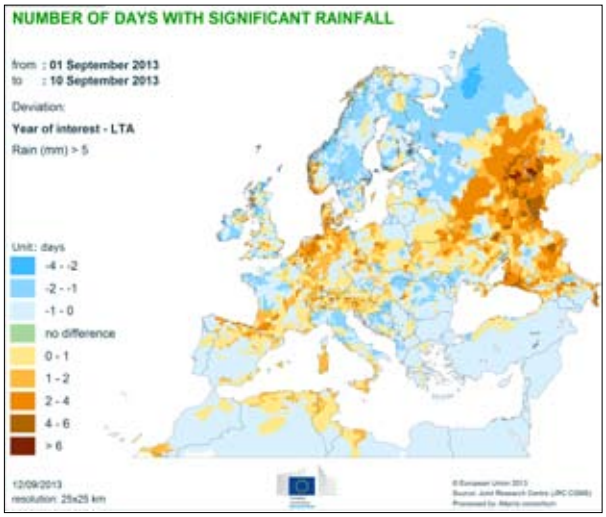

RAINFALL
Cumulated values
from : 01 September 2013
to : 10 September 2013
Year of interest (YOI)
Unit: mm
>= 0 - < 1
>= 1 - < 2
>= 2 - < 5
>= 5 - < 10
>= 10 - < 15
>= 15 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40 - < 60
>= 60 - < 80
>= 80 - < 100
> 100
12/09/2013
resolution: 25x25 km


RAINFALL
Cumulated values
from : 01 September 2013
to : 10 September 2013
Deviation:
Year of interest - LTA
Unit: mm
< -40
>= -40 - < -30
>= -30 - < -20
>= -20 - < -10
>= -10 - < -5
>= -5 - < 5
>= 5 - < 10
>= 10 - < 20
>= 20 - < 30
>= 30 - < 40
>= 40
12/09/2013
resolution: 25x25 km

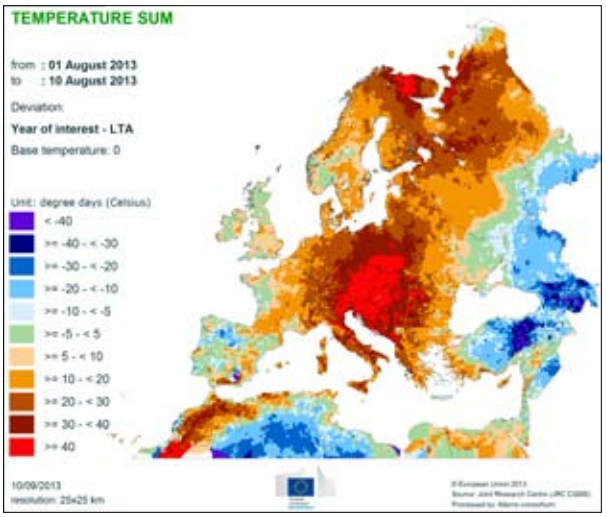

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 August 2013
to : 10 August 2013
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
-4 - -2
-2 - -1
-1 - 0
no difference
0 - 1
1 - 2
2 - 4
4 - 6
10/09/2013
resolution: 25x25 km

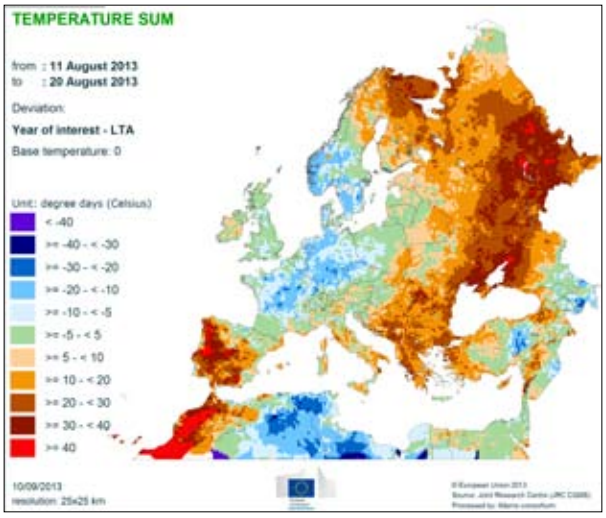

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 11 August 2013
to : 20 August 2013
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
-4 - -2
-2 - -1
-1 - 0
no difference
0 - 1
1 - 2
2 - 4
4 - 6
10/09/2013
resolution: 25x25 km

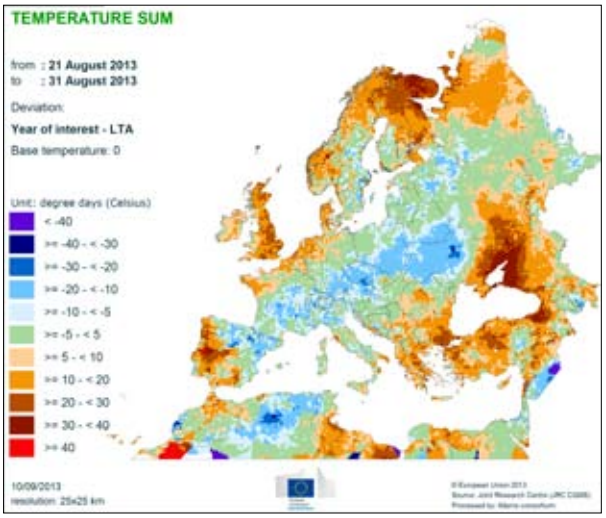

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 21 August 2013
to : 31 August 2013
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
-4 - -2
-2 - -1
-1 - 0
no difference
0 - 1
1 - 2
2 - 4
4 - 6
10/09/2013
resolution: 25x25 km

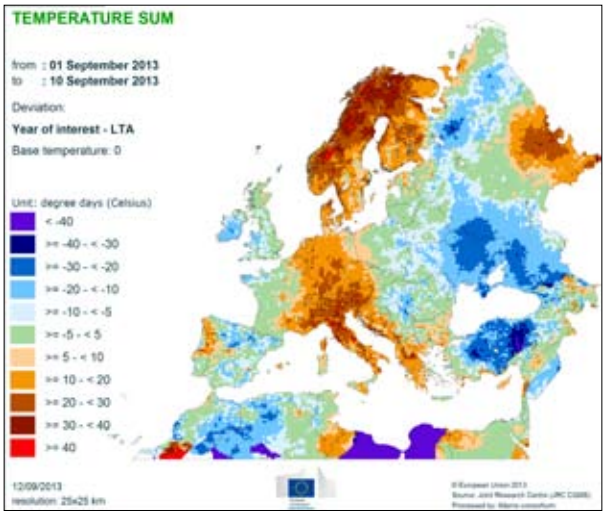

NUMBER OF DAYS WITH SIGNIFICANT RAINFALL
from : 01 September 2013
to : 10 September 2013
Deviation:
Year of interest - LTA
Rain (mm) > 5
Unit: days
-4 - -2
-2 - -1
-1 - 0
no difference
0 - 1
1 - 2
2 - 4
4 - 6
> 6
12/09/2013
resolution: 25x25 km

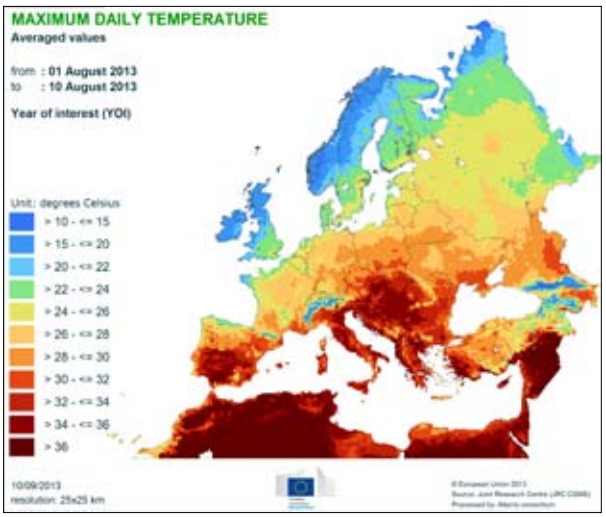
Temperatures

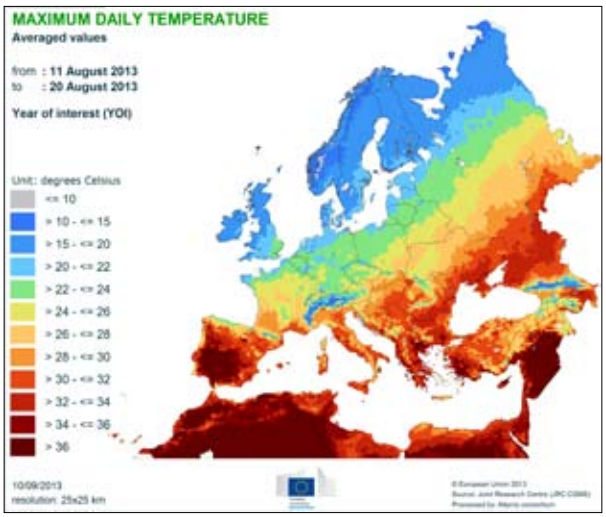


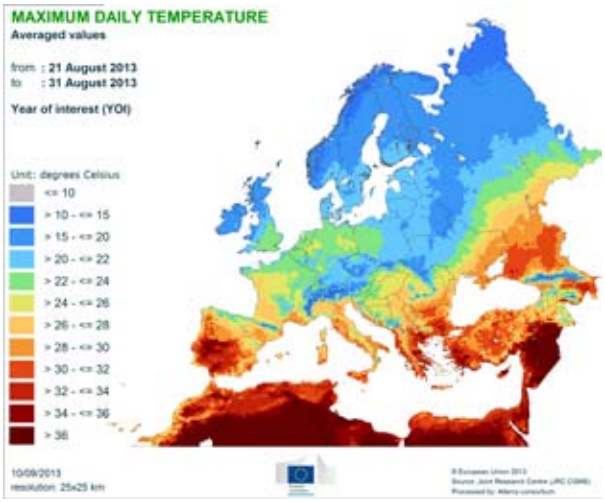


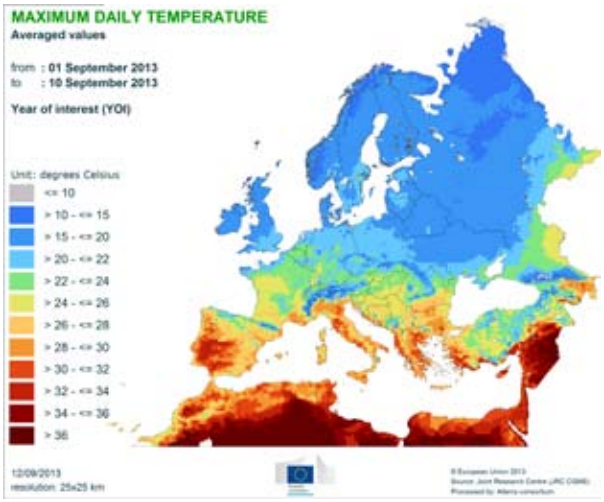




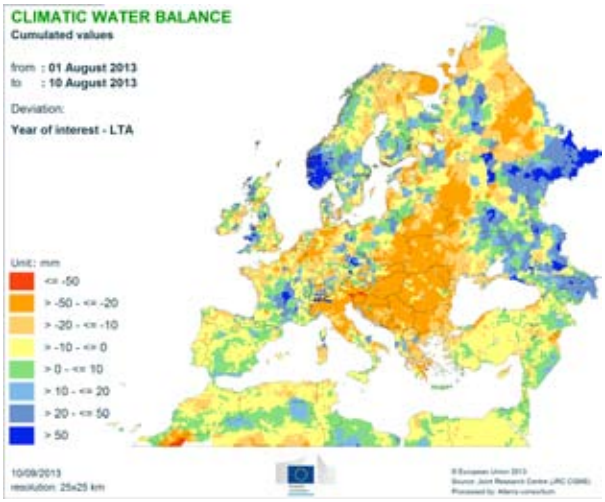


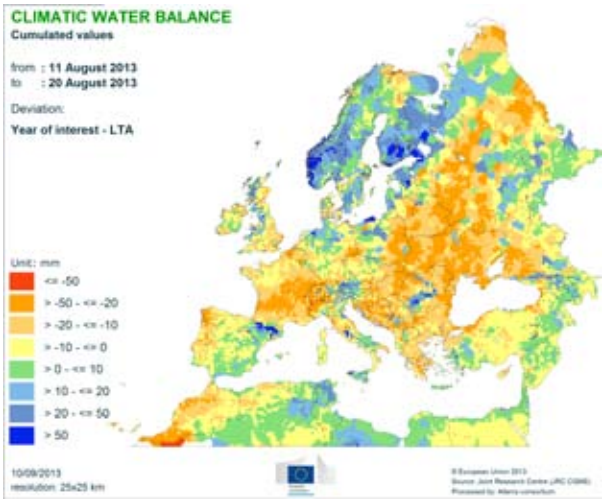


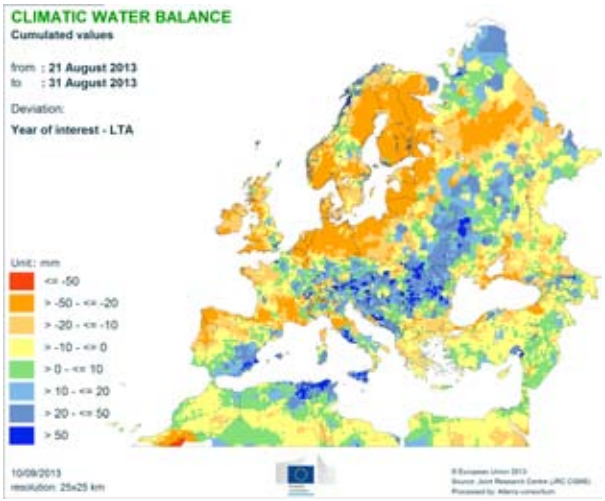


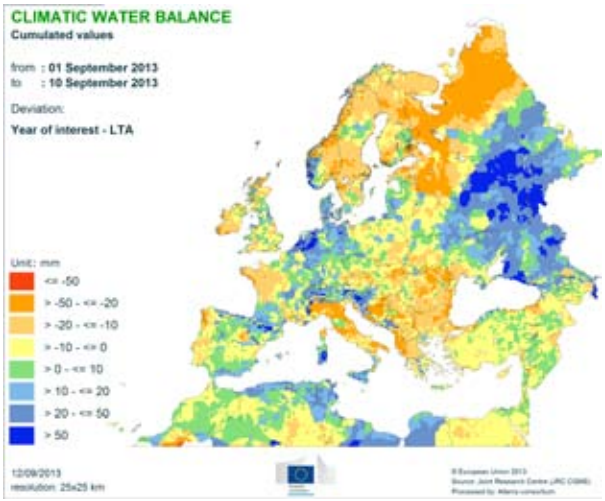


Climatic water balance

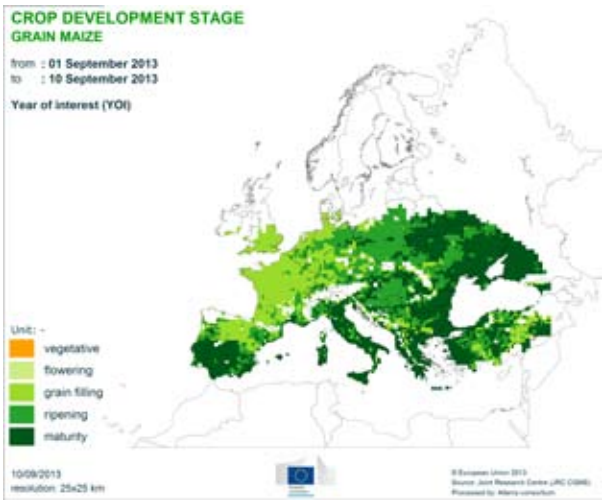


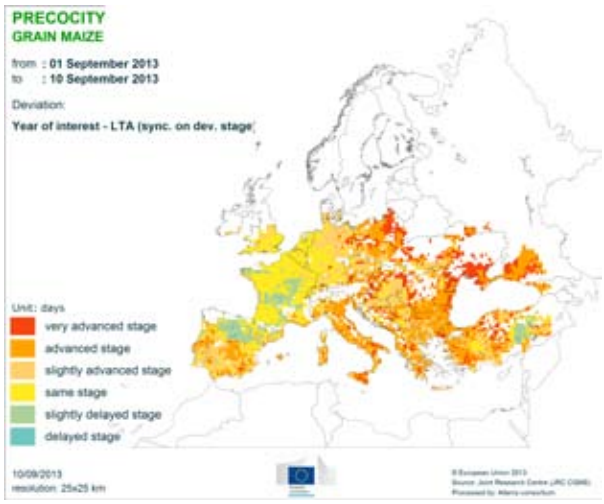


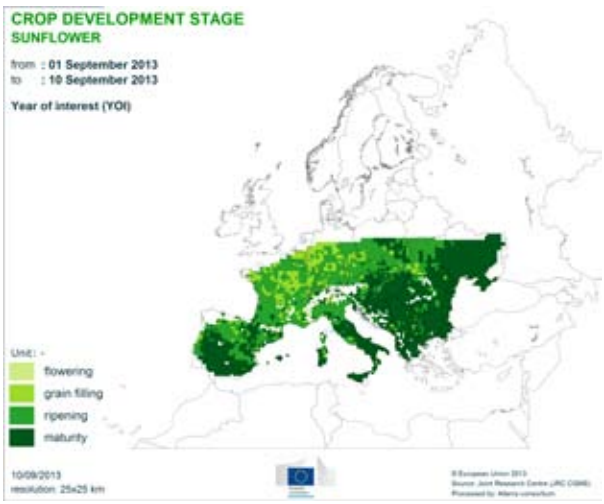


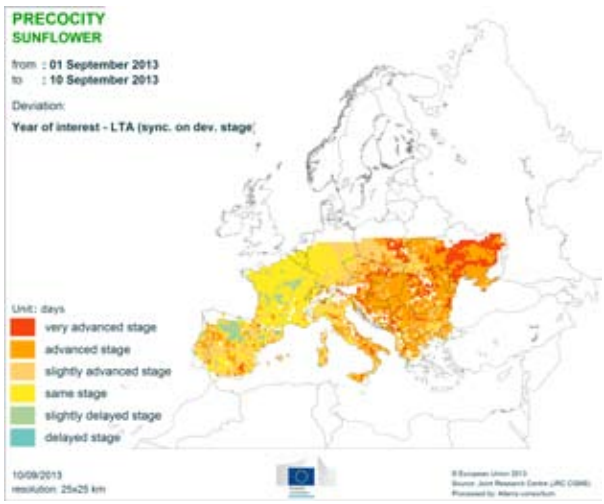


Crop development stage and precocity

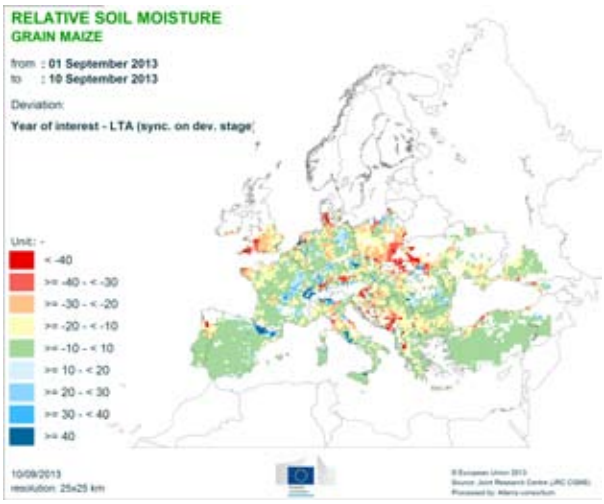


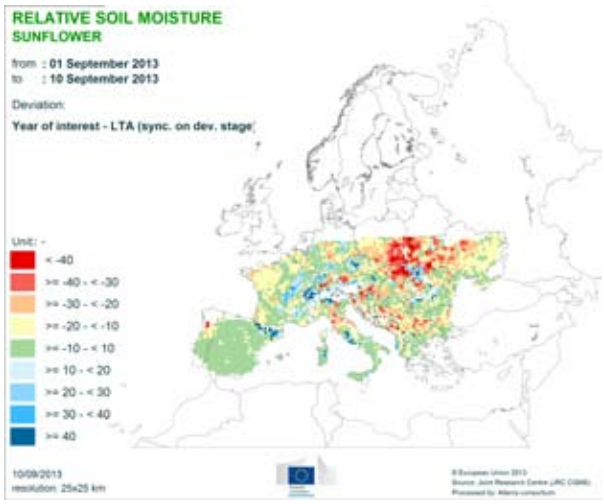




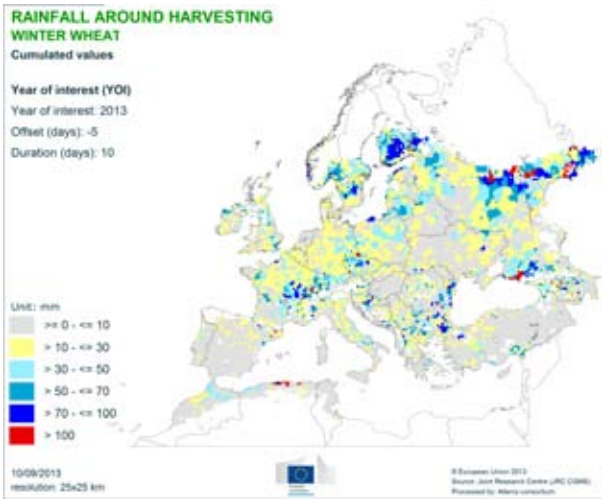


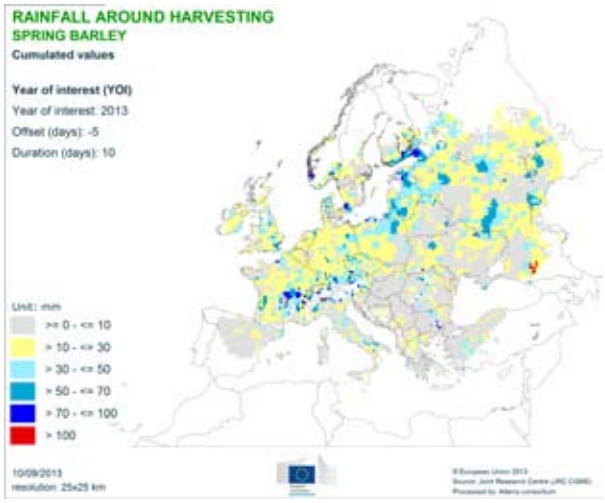
Relative soil moisture

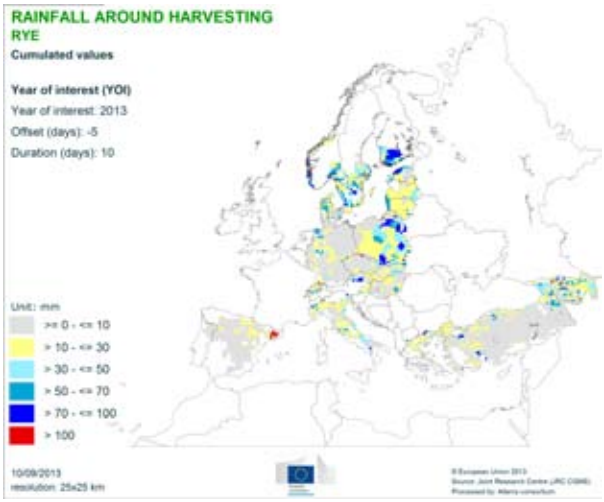


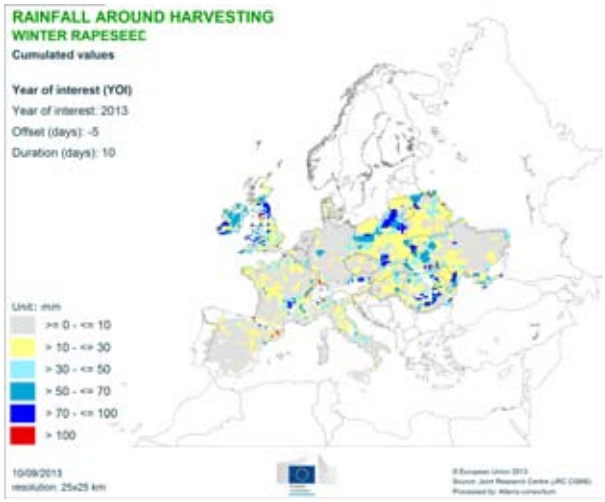


Rain around harvest

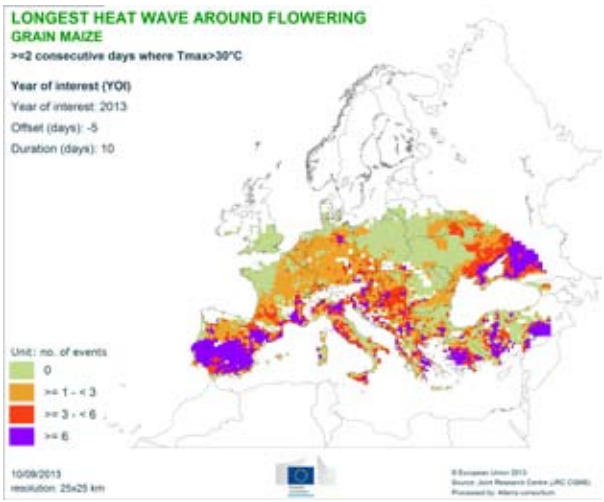


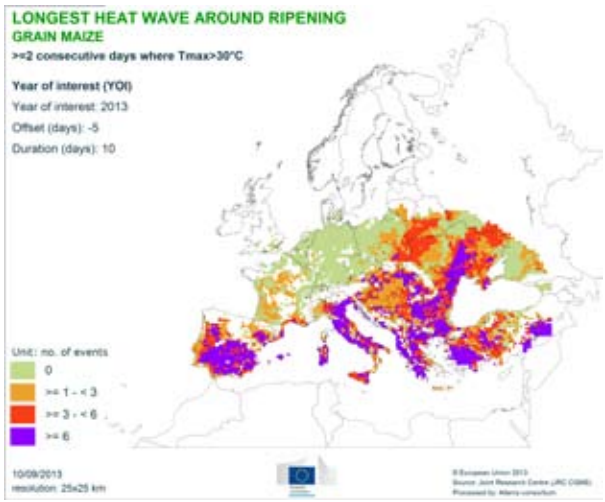






Heat wave around flowering and ripening





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2013 MARS Bulletins

Date	Publication	Reference
21 Jan	Agromet. analysis	Vol. 21 No. 1
25 Feb	Agromet. analysis	Vol. 21 No. 2
25 Mar	Agromet. analysis and yield forecast	Vol. 21 No. 3
22 Apr	Agromet. analysis, remote sensing analysis, and yield forecast	Vol. 21 No. 4
21 May	Agromet. analysis, remote sensing analysis, and yield forecast, pasture analysis	Vol. 21 No. 5
17 Jun	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update	Vol. 21 No. 6
22 Jul	Agromet. analysis, remote sensing analysis, and yield forecast, pasture update, rice analysis	Vol. 21 No. 7
26 Aug	Agromet. analysis and yield forecast, pasture update	Vol. 21 No. 8
16 Sep	Agromet. analysis, remote sensing analysis and yield forecast, pasture update	Vol. 21 No. 9
21 Oct	Agromet. analysis, remote sensing analysis and yield forecast, pasture analysis, rice analysis	Vol. 21 No. 10
25 Nov	Agromet. analysis, campaign review and yield forecast	Vol. 21 No. 11
16 Dec	Agromet. analysis	Vol. 21 No. 12

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Analysis and reports
B. Baruth, I. Biavetti, A. Bussay, A. Ceglar, O. Chukaliev, G. Duveiller, G. Fontana, S. Garcia Condado, S. Karetsos, R. Lecerf, R. Lopez, L. Seguini, A. Srivastava, M. Van den Berg.

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G. Mulhern

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B. Baruth, M. Van den Berg

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Contact
JRC–IES-MARS / AGRI4CAST Action
info-agri4cast@jrc.ec.europa.eu

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The mission of the JRC-IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global

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The long term average (LTA) used within this Bulletin as a reference is based on an archive of data covering 1975-2012.

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